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**Annual Report of the Director-General
on the Implementation of the Work Programme and Budget for 2018-2019**

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INTRODUCTION

1. This report provides an account of the progress the Agency has made in the implementation of the *Work Programme and Budget for 2018-2019*. As the first year of the biennium comes to close, it is evident that IRENA's programmatic direction defined in the *Medium-term Strategy 2018-2022*, as established by its Assembly, provides a firm and proven framework for the Agency in the long-term, given the ongoing energy transition. Responses to technological developments and breakthroughs, demographic and social change, shifts in global economic relations, rapid urbanisation, and environmental concerns are transforming the energy sector. As a result, the energy system has come to the forefront of the global agenda. It is driven by a diversity of objectives, including development, sustainable growth, climate change, energy security, energy poverty, and local pollution considerations. This diversity of objectives has given rise to a diverse set of approaches by countries according to their specific conditions.

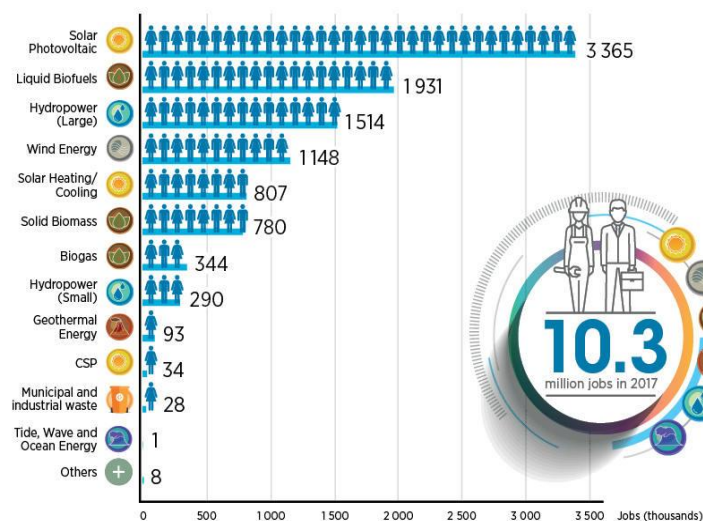
2. A unifying constant is the recognition that renewable energy, coupled with energy efficiency, is an available and necessary means to overcome many of the most pressing energy challenges of the 21st century. In its landmark report released in October 2018, the UN Intergovernmental Panel on Climate Change (IPCC) stated that urgent and unprecedented changes are needed to stop global temperatures from rising over 1.5°C. The report also stressed that such changes are possible and that investments in low-carbon energy technology and energy efficiency are a central avenue for shared prosperity and economic stability.

3. This message is echoing IRENA's vision of the future. The IRENA report entitled *Global Energy Transformation: A Roadmap to 2050 (GET 2050)*, released at the Berlin Energy Transition Dialogue in April 2018, highlighted that meeting climate goals would require a significant acceleration in both power and end-use transformation. The report estimated that the share of electricity in total energy use must double, while at the same time the renewable share of electricity must reach 85%. The report also shows that substantial electrification of transport and heat, combined with higher uptake of renewable energy and increased energy efficiency, would deliver over 90% of the climate mitigation needed to maintain the "well-below" 2°C limit. Such a system would bring a range of socio-economic benefits, including job creation with the shift estimated to create 19 million new jobs by 2050. IRENA's Annual Job Review released in May 2018 shows that the renewable energy sector to date employed 10.3 million people worldwide, becoming the fastest growing source of jobs in several countries.

Renewable Energy and Jobs Annual Review 2018



The renewable energy sector employs 10.3 million people, adding 500,000 new jobs last year.



4. The growing numbers of jobs reflect the steady growth in renewable energy generation and capacity. IRENA's latest statistics released in June 2018 show that renewable energy generation worldwide increased by 6.7% in 2016 compared to the previous year. The rapid growth of solar and wind continues to drive this increase, accounting for 55% of renewable energy generation since 2012. The statistics also accounted for 85% of the new capacity installed in 2017, which reached a record 167 gigawatts (GW), making up 61% of capacity added worldwide.

5. These developments are significant, but they are now expected given the trends in the past few years. New trends are emerging indicating that the speed of energy transformation is accelerating and new players are joining the global quest for a sustainable future. IRENA, in collaboration with the Clean Energy Ministerial (CEM), has undertaken the first comprehensive analysis of companies that are sourcing renewable electricity as part of their corporate strategy. The study, released at the 9th meeting of the CEM in Copenhagen, Denmark, shows that companies sourced renewable electricity in 75 countries, with over 50 companies meeting 100% of their power demand from renewables. Considering that the commercial and industrial sectors account for 64% of the electricity use, this trend is indicative of a growing wave of corporate procurement of low carbon energy that will increase in scale and geographical scope.

6. The concurrent effects of technological advances, policy measures, the growth of distributed generation, and new forms of competition are having a transformative impact on energy markets and business models. Investors are increasingly eager to engage in the opportunities that unfold and markets are witnessing novel ways of attracting financing to satisfy this interest. Innovation is at the heart of these shifts, which herald the prospect of a very different energy system for the future. IRENA convened its second Innovation Week in September 2018, which provided a platform for a diverse group of 350 experts and decision-makers from the public and private sectors from over 70 countries to discuss innovation for the transformation of the power sector. Discussions showed that, with the increase in the share of renewable energy, areas that have been regarded as marginal to the sector are now shaping the emerging power system. Bolstered by the transformative nature of IT developments, smart grids, micro-grids, electric vehicles, local generation, and local storage all create opportunities to engage new stakeholders. The discussions showed that the speed of innovation had accelerated rapidly, indicating that many of the solutions needed for a renewable-powered future already exist.

7. Global energy transformation trends, while promising, are still lagging behind on meeting the objective of the Sustainable Development Goal on Energy (SDG7), which calls for universal access to affordable, reliable, sustainable, and modern energy by 2030. Under the theme 'Transformation towards sustainable and resilient societies', the United Nations High-level Political Forum on Sustainable Development (HLPF) reviewed the implementation of SDG7, among others, in July 2018. The SDG7 review session, moderated by the IRENA Director-General, underscored the importance of accelerating renewable energy deployment to realise SDG7, but also its critical importance for several other key goals, including health (SDG3), jobs and economic growth (SDG8), sustainable cities (SDG11), and climate action (SDG13). The next SDG7 Technical Advisory Group meeting will take place alongside the IRENA Assembly in January 2019.

8. The HLPF review highlighted the central role of off-grid solutions to achieving universal energy access and sustainable development. IRENA's fourth edition of the International Off-grid Renewable Energy Conference and Exhibition (IOREC) that took place during the Singapore International Energy Week (SIEW) provided a platform for concerted action for accelerating the deployment of off-grid solutions. Such solutions are urgently needed for the health sector, where an estimated one billion people are served by health facilities without electricity. To forge partnerships and help develop pathways to meet this pressing need, IOREC was followed by the First International Conference on Renewable Energy for Healthcare.



Review of SDG7 at the High-Level Political Forum in New York in July 2018

9. IRENA is a witness of, and an active participant in, the global energy transformation. The demand for renewables is inexorably growing, while meeting three priorities: reliability, affordability, and environmental responsibility. This is also reflected in the growth of IRENA's global family, which now includes 159 Members and 24 countries in the process of joining the Agency. The international co-operation on renewable energy has truly become a global endeavour, with IRENA as a locus of knowledge, information, and partnerships necessary to accelerate progress.

10. The present report details the implementation of programmatic activities for the 2018-2019 biennium, informs its Members of the Agency's performance and shares information on selected analytical findings and regional and country experiences. The report includes the matrix of outputs, which has been refined to reflect the new structure and orientation. To show the scope and scale of additional resources generously provided by several Members, as well as how they support the Agency's Work Programme and strategic mission, the annual report also includes an overview of projects supported by voluntary contributions. This provides greater clarity on the use of resources and visibility of contributions of non-core resources to the Agency's performance. The details of IRENA's human and financial resources are provided as at 1 December 2018.

Thematic Programme Areas

I. Centre of excellence for energy transformation

11. The energy transformation, with renewable energy and energy efficiency at its centre, is arguably one of the most critical processes being undertaken globally today; it is transforming the way we live and grow as a society. Sound analyses and advice on the pathways to create a renewables-based global energy system is central to a sustainable growth path for many economies as well as to the ability to achieve the transformational goals set out in the Agenda 2030 and the Paris Agreement on climate change. Through its analytical work and global network, IRENA is addressing these needs and capturing lessons learned and best practices to accelerate the common learning curve.

Transformation pathways

12. The transformation of the energy sector is an undertaking which demands informed decision-making across all sectors. IRENA's roadmap for renewable energy, REmap, has, to date, provided an outlook of what is possible by 2030. To stay abreast of the country and global needs, REmap is now integrating longer-term perspectives to 2050. The Global Energy Transformation: A Roadmap to 2050 (GET 2050) report highlights a pathway for scaling-up and accelerating the energy transition. Since its release in April 2018, the report has provided an important perspective for IRENA and its Members to show that renewable energy, when combined with energy efficiency, form the basis for long-term decarbonisation and low-carbon development with positive socio-economic outcomes. Findings from the report have been disseminated widely and served as an input to a range of programmatic activities. To amplify the reach, the executive summary has also been translated into six languages.

13. GET 2050 highlights the importance of increasing investment in energy efficiency as well as renewable energy. In a forthcoming briefing note, the Agency will present an in-depth assessment of energy investments, avoided investments, and stranded assets in the energy system up to 2050, and the potential risks associated with delaying actions. This analytical work will feed into a new edition of GET 2050, to be launched in April 2019, with support from the Government of Germany. IRENA has also begun a comprehensive analysis of the technical and economic potential for electrifying end-use sectors, in co-operation with the State Grid Corporation of China (SGCC). The Executive Summary will be shared at the ninth session of the IRENA Assembly.

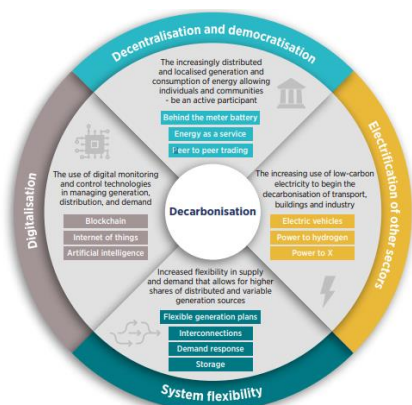
Renewable Energy Prospects for the European Union

The *Renewable Energy Prospects for the European Union* report released in February 2018 detailed how the EU could increase the level of renewable energy ambition by 2030. The report provided a timely input in a discussion on the EU legislative framework for renewables for the 2020-2030 period. Aligned with IRENA's recommendations, the EU target was raised to 32% in June 2018.



14. In order to integrate different facets of IRENA's work in the context of REmap such as planning, flexibility, and grid assessment models, the REmap tool has been updated and enhanced to allow for a longer-term time horizon and energy transition analysis. With continuous support from the Government of Germany for REmap, the second phase of this upgrade, which is focused on deepening energy efficiency analysis, is also underway. IRENA is also contributing to and participating in several energy planning partnership fora, including the Energy Modelling Platform for Africa (EMP-A), International Energy Workshop (IEW), the DFID Energy Planning Roundtable initiative, and energy expert meetings hosted by the International Atomic Energy Agency (IAEA). IRENA inputs included reviews of joint best practices reports and participation in partners' meetings.

15. Such collaboration is proving to be of immense benefit to exchange experiences and maximise synergies among planning entities. It is also a benefit to IRENA as the operating agent of the CEM Campaign on Long-term Energy Scenarios for Clean Energy Transition (LTES). To date, 11 countries have joined as members of the Campaign, and IRENA has worked to broaden this community through partnerships with six technical partners¹. Together, LTES Campaign members and partners have begun to facilitate dialogue and exchange best practices through a regular weekly webinar series, and dedicated sessions at inter alia the International Energy Workshop (IEW), IRENA Innovation Week, the International Forum on Energy Transitions (IFET) in Suzhou, and the Global Sustainable Technology and Innovation Conference (G-STIC). Germany has supported IRENA's contribution to the CEM Campaign in 2018 and the future work will be supported by the Government of Denmark.



16. Expanding the suite of tools to support the energy transformation, IRENA has developed the FlexTool, a new tool to help assess flexibility in power systems with high shares of renewable energy. The IRENA FlexTool has been designed to complement and further validate results from REmap and national energy plans by providing a more detailed analysis of the power system through operational analysis and flexibility assessment. The FlexTool has been launched at the sixteenth meeting of the IRENA Council together with the new report "Power System Flexibility for the Energy Transition". The tool was piloted with the assessment of system flexibility in Colombia, Panama, Thailand, and Uruguay, leveraging country engagement in the REmap process. At the request of nine Latin

American countries, the case studies for Colombia and Uruguay have been presented at the Second Regional Forum of Energy Planners from Latin America and the Caribbean in October 2018. At the 9th Assembly in January 2019, IRENA will release the guidebook, entitled 'Transforming Small-Island Power Systems: Technical Planning Studies for the Integration of Variable Renewables', which highlights the variable renewable energy (VRE) integration planning required to overcome technical challenges, the studies needed to analyse and quantify such challenges, and the solutions to overcome them.

17. In March 2018, the joint IRENA-IEA-REN21 report on Renewable Energy Policies in a Time of Transition was launched at the Berlin Energy Transition Dialogue. This report highlighted the need for policies to support the deployment of renewables in end-use sectors (heating and cooling and transport) and for policy design to address objectives beyond deployment, such as development and the integration of VRE. IRENA is conducting a study on Policies for Renewables in Heating and Cooling that analyses the successes of policy instruments used in various contexts, based on country case studies. Moreover, IRENA continues analysing auctions globally and disseminating lessons

¹ IEA and its ETSAP programme, EU Joint Research Centre (JRC), NREL's Joint Institute for Strategic Energy Analysis (JISEA), China National Renewable Energy Centre (CNREC), and State Grid Corporation of China.

learned and best practices in the design and implementation of auctions. In the current work, the analysis focuses on the design of auctions to achieve broader objectives, such as the integration of high shares of VRE, supporting an inclusive and just energy transition, and ensuring that projects come to completion and are performed sustainably. The findings of IRENA's work on the topic were discussed in the Programme and Strategy Committee (PSC) meeting at the sixteenth meeting of the Council.

PSC meeting on Renewable Energy Auctions – Global Trends and Country Experiences

The objectives of the meeting were to i) discuss the latest innovation in design elements to achieve specific country objectives, i.e, focusing solely on procuring renewables at the lowest price; integrating higher shares of renewables into the grid; ensuring greater participation of communities, small/new players; and maximising the socio-economic benefits; (ii) gather policy makers, and relevant experts to examine lessons learnt and discuss challenges commonly faced in achieving the set objectives, and identifying potential solutions; and (iii) discuss IRENA's ongoing work on the topic, and receive feedback from Members on the support they may require in the design and implementation of their future auctions, if they are the policy of choice.

The meeting gathered experts on auctions including developers (Masdar and ACWA Power), utilities (Abu Dhabi Water and Electricity Company and former CEO of the Office National de l'Electricite du Maroc), financing institutions (EBRD) and representatives from Member countries that have implemented auctions, to share lessons learned and best practices in the design and implementation of auctions.



18. As part of its work on energy transformation, IRENA is conducting an in-depth analysis of the power market design that is fit for the ongoing transition and able to incorporate all the new available technology elements efficiently. This analysis feeds into different knowledge products that address the issue for both regulated and liberalised power market setups. A policy brief, which is planned to be published in Q1 2019, entitled “Market Design for an Integrated and RE-based Energy System”, will draw upon the “Adapting Market Design to High Shares of Variable Renewable Energy” report, which was launched in 2017.

19. Considering the significant role of cities in energy transformation, IRENA is undertaking a range of analytical and technical activities to gain insights into urban best practices, technology solutions, and economic aspects. Supported by the International Climate Initiative (IKI) of the German Government, IRENA has started a review of the methods and tools for urban energy system planning to improve the understanding of how the existing methods and tools/models are used for urban renewables energy system planning. The review focuses on knowledge gaps, as well as the need for technical assistance, and provides recommendations on how to close the gaps identified in the methods and tools/models. In addition, IRENA is developing technical concept guidelines for renewable heating and cooling systems in cities, and for the methodological framework that cities can

Co-operation with Hebei Province of China

The State Council of China has granted the Zhangjiakou City, Hebei Province, a status of National Renewable Energy Demonstration Area. Zhangjiakou is located some 170km northwest of Beijing and endowed with a vast amount of renewable energy resources. Systemic innovations in renewable energy technology applications, infrastructure development, business models, and the regulatory framework will be showcased to the rest of China. The endeavour will also benefit the 2022 Winter Olympic Games. In collaboration with the Municipal Government of Zhangjiakou City, IRENA has developed the draft of *Energy Transition Strategy for Zhangjiakou* to provide the strategic guidance to the energy transition process and an important input in implementing the Chinese Co-ordinated Development Plan for the Beijing-Tianjin-Hebei Region.



*Signing of the Memorandum of Understanding between IRENA and Hebei Province, featuring the Director-General of IRENA and the Governor, Mr. XU Qin
Photo credit: Hebei Provincial Government*

use to assess their renewable energy potentials, identify technological options, or set their long-term renewable energy targets. In the context of this project, IRENA is also analysing best practices on policy frameworks in renewables deployment in selected cities in China, Costa Rica, and Uganda. This work is undertaken with the support of the International Climate Initiative (IKI) of the German Government.

20. IRENA also continues to support the sustainable scale up of bioenergy as a vital component of the energy transformation. Following a side event on Bioenergy for Sustainable Development at the Agency's eighth Assembly, a bioenergy co-operation group was convened with the participation of

the Biofuture Platform, Global Bioenergy Partnership, IEA Bioenergy, SEforALL bioenergy hub, World Agroforestry Centre, World Bioenergy Association, and other multilateral bodies. A key focus of the group is outreach to development agencies to better understand what they are doing to support sustainable bioenergy scale up and recommend how these activities might expand.

Access solutions

21. At the United Nations High-Level Political Forum (HLPF) in July 2018, IRENA launched two analytical briefs focusing on off-grid renewable energy solutions: one on the current status and deployment trends of off-grid solutions based on ongoing efforts to improve the data gaps in the sector (see box below) and the other on the linkages between off-grid renewables and the Sustainable Development Goals with case studies from South East Asia. IRENA presented findings from these reports at several events during HLPF, including those organised by Hivos, Energia, Pace University, and the Governments of Germany, Nepal, the Kingdom of the Netherlands, and Norway. At the 4th International Off-grid Renewable Energy Conference (IOREC), IRENA also launched a report on policies and regulations for renewable energy mini-grids. A Ministerial Roundtable on “Off-grid Renewable Energy Solutions for Universal Electricity Access and SDGs” will be held at the IRENA Assembly. The discussion will benefit from IRENA’s input paper on status and trends in off-grid renewables and solutions to scale-up deployment.

22. The International Off-grid Renewable Energy Conference and Exhibition (IOREC) is a global collaborative platform convened biennially by IRENA for sharing experiences and best practices in deployment of off-grid renewable energy solutions, both stand-alone and mini-grid systems. Following the previous IORECs held in Ghana in 2012, Philippines in 2014, and Kenya in 2016, the 4th edition of IOREC was convened in Singapore on 31 October and 1 November 2018 during the Singapore International Energy Week 2018, in conjunction with the ASEAN Ministers on Energy Meeting. During IOREC, IRENA launched its publication “Policies and regulations for renewable energy mini-grids”. External partners also used IOREC as a platform to launch their campaigns and publications – Power 4 All launched its campaign on powering jobs in the off-grid renewable energy sector, and SELCO Foundation took the opportunity to launch its report on off-grid renewable energy and livelihoods.

Key messages from IOREC 2018

- Modern energy access is central to achieving the Sustainable Development Goals and governments should consider the entire spectrum of opportunities offered by off-grid renewable energy solutions for expanding affordable, reliable and sustainable access to households, support livelihoods, enhance delivery of essential services (e.g., health) and strengthen gender equality.
- National level electrification strategies and plans should mainstream off-grid renewable energy solutions and facilitate co-operation between actors.
- To ensure effective implementation of energy access plans, institutional and legal frameworks at the national level should clearly define roles and responsibilities of public sector institutions, streamline administrative procedures and ensure adequate capacities.
- To ensure private sector involvement in energy access, the policy and regulatory framework should provide the right set of incentives and risk coverage to private investors and alleviate the barriers to unlock financing for the sector.
- Regulations are of particular importance in the case of renewable energy mini-grids where governments have the dual role of ensuring economic viability for developers while ensuring tariffs are not too high for underserved communities. Furthermore, with the right set of regulations in place, main grid arrival, often seen as a major risk for mini-grid developers, can become an opportunity both for developers and utilities alike.

- The financial instruments and products on offer from banks and other financing institutions do not always match the sector demands. To foster innovation in the sector and accelerate deployment, financing instruments on offer need to be tailored especially to the requirements of end users and small enterprises.
- Putting in place the right ecosystem for accelerating off-grid renewable energy deployment requires efforts to develop the necessary human capital by building capacities across the off-grid value chain and supporting local entrepreneurship.
- Off-grid renewable energy should be viewed as a job creating opportunity as it has the potential to create millions of jobs across the value chain.
- Efficient end-use appliances need to be included in the off-grid ecosystem to ensure affordability and long-term sustainability.
- Ground-breaking improvements in off-grid renewable energy solutions are under way, particularly in digital technology and small-scale energy storage that are expected to bring system costs dramatically down over the next two decades.



23. It is estimated that 1 billion people are served by health facilities without electricity. Cognisant of the need for increased action on this issue, IRENA organised the First International Conference on Renewable Energy Solutions for Healthcare Facilities, on 2 November 2018 in Singapore. The conference brought together key energy and health sector stakeholders, including policy-makers, practitioners, financing institutions, development partners, and NGOs that play a role in enhancing electricity access for rural healthcare facilities in low-income areas. Off-grid renewable energy solutions represent fast-deployable, reliable and cost-effective solutions. To address the energy access requirements of healthcare facilities, there is an urgent need for increased co-operation between energy and health sectors (including ministries of energy and health) at all levels, from strategy and planning to policies, budgeting, procurement and implementation. Furthermore, there is a strong need for innovation in delivery and financing models and dedicated financing schemes by banks and financing



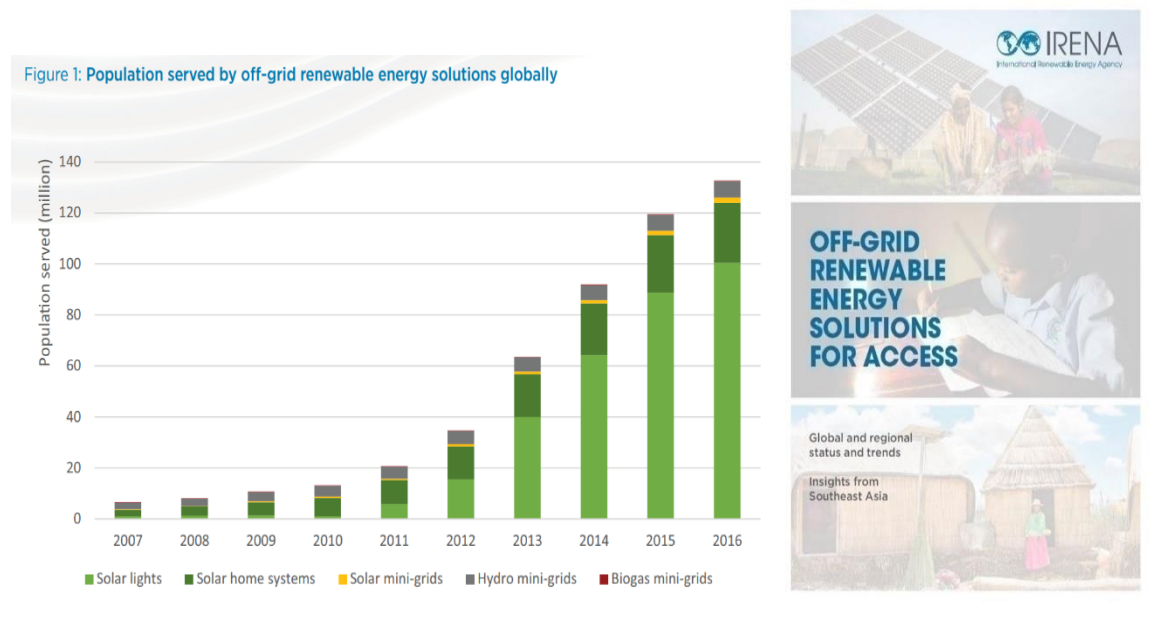
institutions. Innovation should be encouraged across the entire value chain, including in the design of tailored and efficient medical devices suited for use in rural areas. Finally, it is of the utmost importance to enhance collaboration and partnerships between private, public and non-governmental institutions and this especially when developing electrification approaches for healthcare facilities. IRENA will build on the outcomes of the conference to define its future activities on the nexus between off-grid renewable energy and healthcare services. A key recommendation stemming from this exchange was that governments and development partners should prioritise electrification of health facilities in electrification strategies and plans.

IRENA statistics reveal that off-grid renewables serve six-times more people globally since 2011

Off-grid renewable energy solutions have emerged as a mainstream option for expanding access to modern energy services in a timely and environmentally sustainable manner.

Based on IRENA’s data and analytical work, the *Off-grid renewable energy solutions: Global and regional status and trends* brief found that the number of people served by off-grid renewables globally has expanded six-fold since 2011, reaching nearly 133 million people in 2016.

The brief also finds that off-grid renewables are delivering a broad spectrum of electricity services for households, public services, commercial, and industrial uses. The findings were presented at an official side event organised by IRENA and the Government of Norway at HLPF 2018.



Accelerating innovation

24. Engagement of stakeholders is of high relevance for all aspects of IRENA’s work; this is perhaps best exemplified in the field of innovation. As an authoritative global organisation, IRENA provides a neutral space for interaction and dialogue, including strengthened co-operation with the private sector and scientific community. To this end, IRENA’s Innovation Week is a key forum as demonstrated in its second edition in September 2018.

25. IRENA also released a range of analytical products and outlooks for selected sectors and technologies that specifically target those areas where viable solutions are yet to emerge, including a technology brief, *Hydrogen from renewable power: Technology outlook for the energy transition*, which was published in September 2018, with the support of the government of Japan. As part of IRENA's input to the 9th Clean Energy Ministerial in Copenhagen, an updated status report on floating offshore wind was released at a side event hosted with industry leaders.

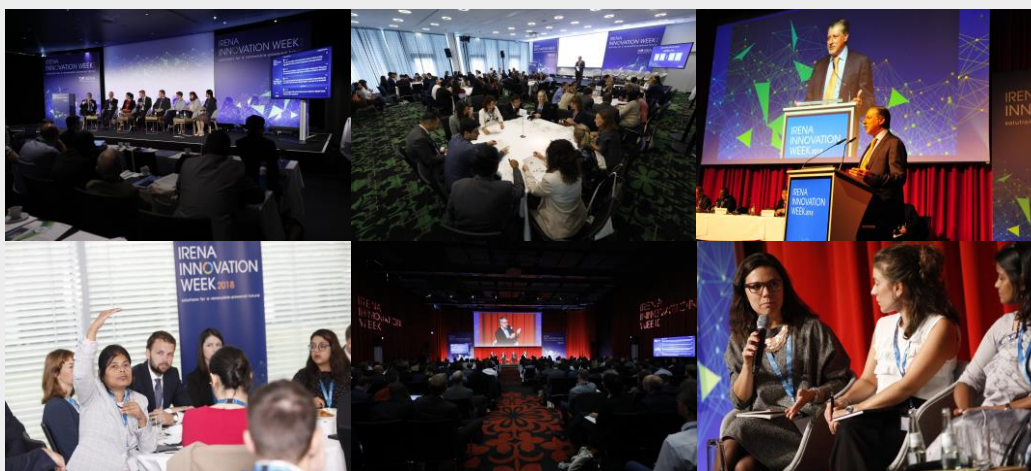
IRENA Innovation Week 2018: Solutions for renewable-powered future

The second IRENA Innovation Week was held in Bonn, Germany, 4-7 September 2018. The event brought together a diverse group of 350 experts and decision-makers from the public and private sectors from over 70 countries.

Discussions focused on the landscape of innovations for power-sector transformation and explored latest developments in ***enabling technologies, business models, system operation, and market design*** that are increasing the integration and flexibility of power systems; enabling the much higher deployment of variable renewable energy sources, such as solar and wind; and supporting increased electrification of the end-use sectors of transport, industry, and buildings.

Speakers and delegates came together for 12 sessions across three tracks: Digitalisation and Decentralisation, Electrification, and Markets and Citizens. An interactive “global innovation showcase” was featured which highlighted the work of award-winning small and medium-sized enterprises (SMEs). Sessions covered cutting-edge topics, including the role of ***blockchain*** in energy, the use of ***artificial intelligence*** and big data, innovations in ***market design***, the ***empowerment of citizens***, the role of ***smart charging*** of electric-vehicles, and the potential roles of ***hydrogen*** and ***storage***.

A key conclusion from the discussions was that many of the solutions we need for a renewable-powered future already exist. However, their adoption is limited to a relatively small number of pioneering countries and companies and there is substantial scope for decision-makers to broaden adoption. IRENA's central role in facilitating this change was further underscored with this remarkable event.



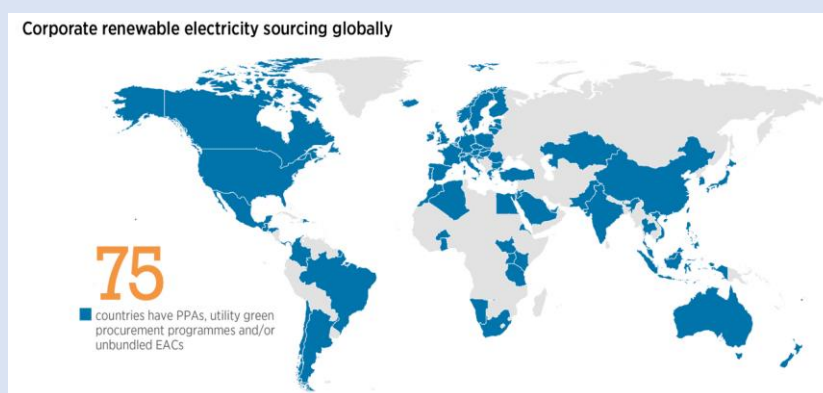
Further details can be found at <http://innovationweek.irena.org>.

IRENA's Director-General also shared the Agency's perspectives on priorities for increased innovation activity with Ministers who gathered for the third Mission Innovation Ministerial; IRENA also published advice to policy-makers on the same topic. Innovation and the disruptive potential of the wide range of innovative solutions emerging were the topic of several sessions run by IRENA during COP24 in Katowice, Poland in December 2018 with IRENA sharing insight from its work.

26. On the occasion of the G7 Ministers of Environment and Energy meeting in Canada last September, IRENA released a paper on the status and prospects of offshore renewable energy. The paper entitled ‘Offshore Innovation Widens Renewable Energy Options’ provided the latest information on the development of the offshore wind industry, opportunities that it brings to countries, and recommendations on how G7 countries may support the expansion of offshore wind and marine energy markets globally.

Corporate Sourcing of Renewable Energy: Market and Industry Trends

The *REmade Index* on corporate sourcing of renewable energy was launched at the Clean Energy Ministerial (CEM9) in Copenhagen in May 2018. Findings revealed that the world market for corporate sourcing of renewable energy in 2017 was 465 TWh, enough to power a country the size of France. In total, companies actively sourced renewable electricity in 75 countries whereby more than 50 companies already source 100% of their electricity from renewable energy sources. The REMade Index was made possible thanks to voluntary contributions from the Government of Germany.



Knowledge hub

27. In 2018, IRENA is conducting a study on renewable energy targets, focusing on the power sector. The objective of this work is to analyse how national energy plans support the achievement of Nationally Determined Contributions (NDCs) and the energy transition. The study will look at the investment needed and the effectiveness of policies that have been put in place to achieve those targets. The work is funded through the voluntary contribution of the Walloon Region of Belgium.

28. To provide access to the most up-to-date information on policy developments, IRENA continues to collaborate with the International Energy Agency (IEA) to expand and enrich the **IEA/IRENA Policies and Measures Database**. This database serves as an important source of knowledge and, in 2017 alone, the database received more than 150,000 visits. In previous years, both Latin America and South East Asia regions were thoroughly updated and the database served for the development of IRENA’s Regional Market Analysis reports for both regions. In 2018, IRENA continues to work with IEA in maintaining the database through rigorous desk-research, with a particular focus on South European countries to assist in the development of IRENA’s next Regional Market Analysis in that region.

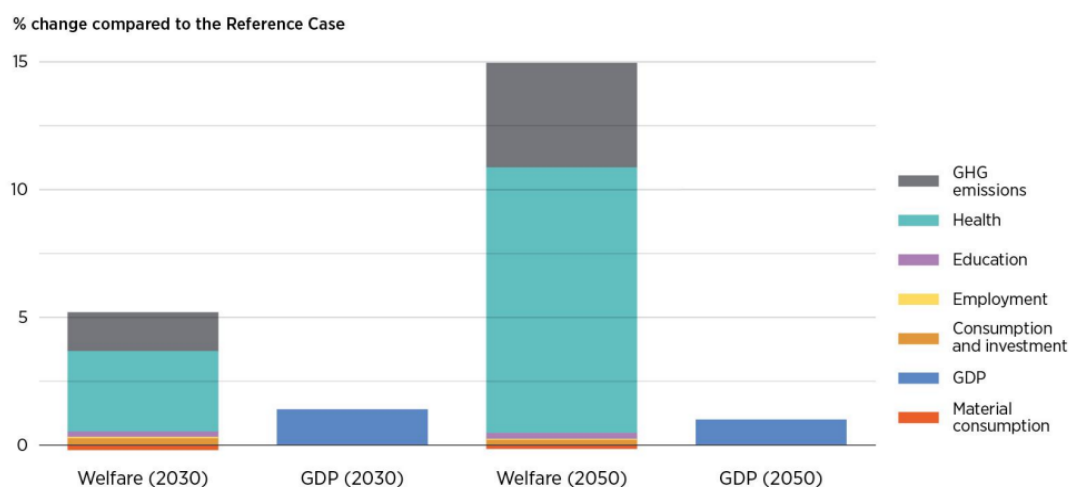
II. Global voice of renewables

29. Rigorous empirical and analytical work, underpinned by the strong support of Members, has enabled IRENA to be the voice of renewables at the global, regional and local levels, among diverse audiences. The Agency's work has influenced the debate in such settings as the UN, G7, and G20, while its data and analyses have gained global recognition and widespread use. IRENA has also been prominent in promoting the role of renewables as a critical contributor to climate efforts. Backed by this body of work, IRENA is engaging with its widening global network to communicate the benefits of renewables and amplify impact.

Realising socio-economic benefits

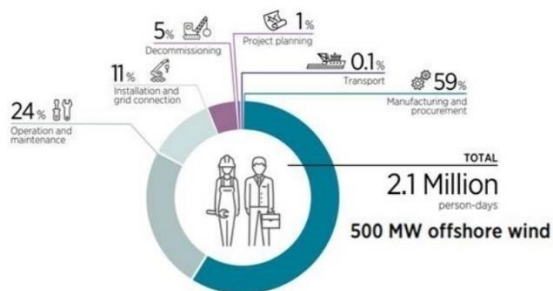
30. IRENA's report, *Renewable Energy Benefits: Measuring the Economics*, published in 2016, was the first global study estimating the macroeconomic impacts of doubling the share of renewable energy by 2030. With growing interest in this field, IRENA expanded the analysis on the low carbon economy to 2050 and assessed macroeconomic impacts of the updated REmap energy mix in 2017 and 2018. The latest results showed that global economic growth would be higher by 1% in 2050 compared to the business-as-usual case, creating additional jobs and welfare benefits. The forthcoming second edition of the report *Renewable energy benefits: Measuring the Economics*, will be presented at the IRENA Assembly in January 2019, providing an updated analysis, through macroeconomic models, of an increased energy transition ambition on the socio-economic variables. Also, the report studies structural changes and sheds light on development benefits that can be achieved through a just and fair transition. Based on the findings, policy recommendations that can promote inclusive growth will be provided.

Global welfare indicators and GDP - the REmap Case compared to the Reference Case, 2030-2050



Human welfare indicator dominated by health and GHG emissions (where the REmap energy transition roadmap makes the highest difference with the Reference Case)

31. Complementing its global analysis on socio-economic impacts of renewable energy, IRENA is finalising the report on the project-level impacts of large-scale projects, in particular solar and wind, entitled '*Maximising local benefits of large-scale renewable energy deployment: Insights from sub-Saharan Africa*'. The report examines key lessons learned and best practices that can be drawn from case studies from the region utilising the frames of employment, community engagement, skills, and gender. This analysis fills an important knowledge gap and supports policy-making towards a just, fair, and inclusive energy transition. The report is expected to be published in early 2019.



32. As part of IRENA’s series on Renewable Energy Benefits: Leveraging Local Capacity, IRENA published the edition on offshore wind in 2018, which illustrates the potential for value creation along the different segments of the value chain, including established industries, such as the shipping industry. The report also shows synergies between offshore and onshore wind and the oil and gas industries. In the last quarter of 2018, IRENA completed a new edition for solar water heaters

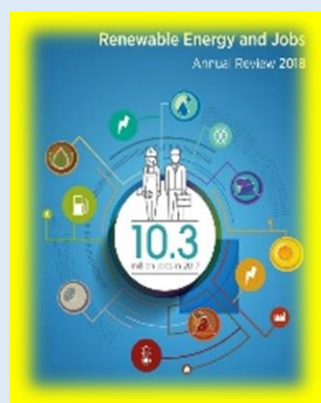
(SWH) which highlighted the policies and measures required to develop a domestic SWH industry along with the potential for value creation in the distribution and retail segment of the value chain. Ongoing discussions and stakeholder consultation are taking place to determine the next technology to be studied as part of this series.

33. The findings of IRENA’s work on the socio-economic benefits have been presented in many major events including the EU Sustainability Week in Brussels, the Berlin Energy Transition Dialogue, the REN21 Academy in Berlin, the Egypt Renewable Energy Conference, COP 24 in Katowice, the Energy Transition: Perspectives and Opportunities for the World of Work organised by the ILO, and the 10th Multi-year Expert Meeting on Commodities and Development organised by the UNCTAD, among many others.

Renewable Energy and Jobs

The 2018 edition of the *Renewable Energy and Jobs – Annual Review* series, launched at the margins of the Agency’s Council meeting in May 2018, provided in-depth updates for the data and analysis of the previous edition. Estimates on jobs and other socio-economic variables from the 2018 edition were used to complement the analysis of the G20 countries in *Accelerating energy transitions through increased deployment of renewables*. The next edition of the *Annual Review* will be prepared for release in May 2019.

As is the case every year, IRENA also provided the sidebar on Jobs in REN21’s *Global Status Report on Renewable Energy*. The Annual Review series has gained extensive traction worldwide, including coverage by media outlets and social media.



Informing markets

34. IRENA's **data and statistics** have become a trusted reference for decision-makers as they take steps towards a clean energy transition. IRENA's Renewable Capacity Statistics were published in March 2018 and the Renewable Energy Statistics were released in June 2018. The latest statistics show that renewable electricity generation rose by 6.7% to reach 5,886 TWh in 2016, with Asia accounting for most of that increase. Wind and solar showed the highest percentage growth in generation (15.8% and 31.3% respectively), although the most significant absolute increase was in hydropower, where generation increased by 150 TWh after recovery from the low water levels experienced in many countries in 2015.

35. IRENA continues to work with countries to improve their national renewable energy statistics through training and the dissemination of technical information. A training workshop for Central Asian countries was held in September 2018 and the second workshop for West African countries is planned for February 2019. Statistics training is co-ordinated with other international energy agencies; IRENA has participated in training events held by APEC and ASEAN this year, while IEA and FAO have contributed to IRENA training sessions.



Participants of the Central Asia Training Workshop at IRENA HQ, September 2018

36. IRENA's **cost data** is a source of timely, up-to-date information that is used by a wide range of stakeholders involved in the energy transition. During the eighth Assembly, IRENA released its latest analysis entitled *Renewable Power Generation Costs in 2017*². As part of the effort to provide transparent data on the cost and performance of renewable energy technologies, the data from the report was also made available online.

37. With the support of the Government of Japan, IRENA has completed a comparison of solar PV costs in Japan and cost reduction opportunities and priorities in a report to be released in December 2018. The analysis has lessons for other high-cost markets and suggests that, although there are some structural reasons for higher costs in Japan, policy-makers have the potential to further drive down costs. Costing data are also combined with REmap capacity projections in a new working paper. This work is supported by the Government of Germany.

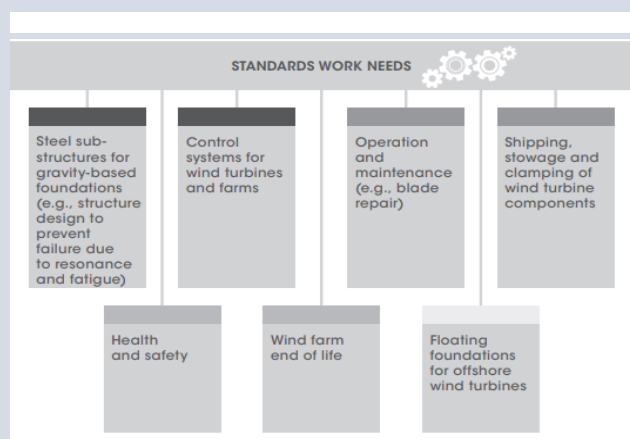
² The executive summary was translated to Japanese.

38. IRENA has analysed learning rates for onshore wind and proposed a methodology that makes this analysis more directly useful to policy-makers. In May 2018, IRENA completed the analysis on the best practices to establish industry standards and quality control measures that foster the expansion of offshore wind markets. The report, *Nurturing Offshore Wind Markets: Good practices for international standardisation*, includes concrete recommendations on how countries can support the offshore wind industry based on best practices from front-runners. In June 2018, IRENA conducted a workshop entitled *Scaling-up solar PV deployment* at the Asian Development Bank's (ADB) Clean Energy Forum. The workshop shared the best practices in quality assurance for PV systems based on regional experts' experience, as well as the Agency's tools and guidelines on how to develop PV projects based on quality assurance, with particular emphasis on locations with extreme weather conditions.

39. The interactive IRENA online tool to manage **patents and standards data**, INSPIRE, now includes new dashboards which enable users to consolidate data and produce charts on a number of patents for different types of renewable energy technologies per country, region, and on different time-scales. These new features are already being used; BE Sustainable Magazine, for example, used the INSPIRE database to provide insights on innovation in biofuels³.

Nurturing Offshore Wind Markets: Good practices for international standardisation

The offshore wind industry requires technical specifications or other precise criteria so investors and policy-makers around the world can achieve predictable outcomes. Internationally accepted standards can help to mitigate technical risks, open market access, remove barriers, improve cost competitiveness, and bolster customer confidence and acceptance in a previously unfamiliar technology. IRENA's report, *Nurturing offshore wind markets: Good practices for international standardisation*, analyses key forerunner markets, such as Denmark, Germany, and the UK, as well as initiatives occurring in emerging offshore wind markets such as China and the United States. The report highlights the best industrial practices for countries interested in deploying offshore wind.



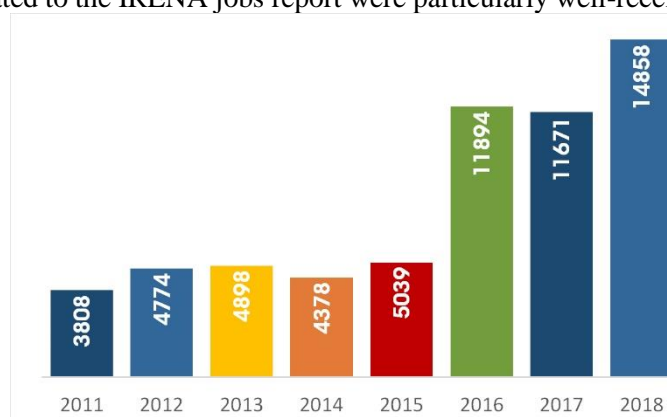
³ <http://www.besustainablemagazine.com/cms2/inspire-insights-on-biofuels-innovation-from-irenas-patents-database/>

Amplifying impact

40. IRENA strengthened its engagement with stakeholders and the public in 2018 by expanding media and social media presence through more frequent distribution of relevant content as well as through using cutting-edge online tools and platforms to diversify and target communications to stakeholders based on their interests. The number of visitors to IRENA **websites** grew from 295,000 in 2017 to 546,000 in 2018⁴, a growth rate of 45%, compared to less than 10% growth in previous years. This rapid growth is due to IRENA bringing in 18 separate portals under the new IRENA website, thereby strengthening its brand and substantially improving discoverability and accessibility of the Agency's work. Featuring IRENA initiatives under one website helps to showcase the work of the Agency in a comprehensive way and also encourages traffic. IRENA's Newsroom was browsed by almost 11% of users, compared to 4% on the previous website. The enriched content of IRENA's website includes new energy source overview pages, with solar and wind energy pages ranking high on visitor numbers and functioning as a gateway for further browsing of related webpages.



41. Additionally, IRENA was featured in more than 14,800 newspaper articles in 2018. Of those articles, 285 were featured in top-tier publications, significantly more than in 2017. Media announcements related to the IRENA jobs report were particularly well-received.



IRENA media mentions over time

42. IRENA publications were accessed online by 35% of all irena.org users and have been downloaded more than 880,000 times. For example, the *Renewable Power Generation Costs in 2017*, widely publicised through press releases (picked up by the Guardian, Reuters, and Valor Econômico, among others), social media and the website, was downloaded over 116,000 times. *Renewable Energy Prospects for the European Union*, prepared in co-operation with the European Commission, was downloaded over 22,000 times, while *Global Energy Transformation: A Roadmap to 2050*, garnered over 26,000 downloads and *Renewable Energy Policies in a Time of Transition* was downloaded more than 14,700 times. Two flagship *Statistics* reports for 2017 and 2018 collectively account for over 53,000 downloads. Summary descriptions of each publication, meanwhile, attract considerably higher viewing numbers. A new email format for sharing targeted IRENA publications, launched in early 2018, more than doubled the email "open" rate among subscribers.

43. IRENA has continued to implement its strategy to target and deploy **social media** for global events, reports, and news. This resulted in IRENA's Twitter following of over 27 million impressions in 2018, 90.5% of the impressions gained during the entire previous biennium. IRENA has strengthened its partnerships and use of influencers to amplify messaging through initiatives like the

⁴ All 2018 figures to 26 November only.

Coalition for Action and #Renewables4Climate campaign on Instagram and Twitter. Throughout the year, targeted marketing has diversified and increased IRENA's Facebook constituency to over 355,000 followers; the page is now growing by over 2,000 followers a week.

44. IRENA deployed a new mass-email service linked to Customer Relationship Management (CRM) software to strengthen communications with various stakeholder groups and to increase the number of email followers. During the year, email acquisition campaigns boosted IRENA's stakeholder database by 50% and more than 50 new, visually appealing emails have been sent to subscribers, which contain a range of useful information. For example, campaigns promoting IRENA's Small Islands Developing States (SIDS) work and IRENA/ADFD Project Facility acquired over 7,000 email addresses.

45. IRENA also sought new avenues for outreach to engage diverse audiences. With the support of the Governments of Italy and the United Arab Emirates, IRENA partnered with renowned multimedia artists to create an exhibit which showcases the primal beauty of renewable energy to a wide audience through a series of multimedia works captured from renewable power installations around the world. The exhibit, *Primal Sonic Visions*, was featured at the Venice Biennale of Architecture between May and September 2018.



46. IRENA strengthened its global visibility as the platform for renewable energy co-operation while providing an engaging and positive experience for participants. IRENA's events, including the Berlin Energy Transition Dialogue, the 9th Clean Energy Ministerial (CEM), the UN High-Level Political Forum, IRENA Innovation Week, and the G7 Ministerial meeting, United Nations General Assembly, COP24, among others, were provided a full range of communication coverage, including live social media, event branding, media engagement, press, photography, and videography.

III. Network hub

47. Transformation of the global energy system requires increased connectivity on national, regional, and global scales. This ranges from regional and national policy considerations, through cross-border trade and grid interconnections, to city and community engagement. IRENA is building on its collaborative frameworks, such as the Clean Energy Corridors, SIDS Lighthouses, and Global Geothermal Alliance (GGA) to conduct needed analyses and to support peer-to-peer exchange, transfer of knowledge, and to provide targeted advice.

Regional action agenda

48. The **Renewable Energy Market Analysis** series captures the wealth of knowledge and experience embedded in a region and identifies emerging trends and themes at the intersection of public policy and market development. The market analysis brings together outcomes from different IRENA areas of work, including policy, data and statistics, finance, costs, benefits, potentials, tools, technology roadmaps, and country support. To date, IRENA has launched three editions of the market analysis focusing on the Gulf Co-operation Council countries (GCC) (2015), Latin America (2016), and South East Asia (2018). In this biennium, IRENA is completing the South-East Europe market analysis which examines the status, the potential, and the policies regarding the renewable energy sector in South East Europe and is engaging with Members from the region to validate the findings. Furthermore, IRENA will release an updated and expanded version of the GCC market analysis at the World Future Energy Summit in January 2019, given the rapid evolution of the region's renewable energy landscape. Underpinned by IRENA's analytical work, regional **action agendas and plans** continue to guide the Agency's activities worldwide. Since January 2018, work has been undertaken to implement regional agendas and plans for Africa, Central Asia, Latin America, South and South East Asia, and South East Europe.

49. **Clean Energy Corridors in Africa.** The Agency is working closely with the African Union Commission (AUC) and New Partnership for Africa's Development (NEPAD) to provide substantive input into the preparatory process for the next phase of the Programme for Infrastructure Development in Africa (PIDA) for the 2020-2030 period. IRENA's significant work, undertaken by the Clean Energy Corridor initiatives in Africa, is contributing to this effort. Specifically, inputs will focus on the assessment of planning and prospects for renewable energy in Eastern and Southern Africa, including country-level resource assessment, zoning of solar PV and wind resources, and variable renewable energy.

50. In partnership with the Economic Community of West African States (ECOWAS) Centre for Renewable Energy and Energy Efficiency (ECREEE), the ECOWAS Commission for Energy and Mines, the ECOWAS Regional Electricity Regulatory Authority (ERERA), the West Africa Power Pool (WAPP) and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), IRENA initiated a capacity building project. Regional training sessions on the planning and operation of grids with higher shares of VRE for grid operators and utility engineers from 14 countries of the West Africa Power Pool were held in May 2018 in Cote D'Ivoire⁵ and Ghana. The theoretical training sessions were complemented by a practical study tour in China, which IRENA organised in co-operation with the State Grid Corporation of China (SGCC). The technical exchanges with the SGCC experts helped the participants consider how to use these experiences and lessons learned in their systems. These series of training sessions helped identify further support included in the follow-up capacity building activities in the region, which will focus on two core streams, namely (i) the economics of power system planning and operation with a focus on economic generator dispatch, ancillary services, short-term markets and spot pricing, reserve calculations as well as grid codes; and (ii) the planning and operation.

⁵ Cote D'Ivoire training was held in French.



ECOWAS Delegation to the Study Tour in China organised in co-operation with SGCC



Visit to a solar park near Zhangbei Test Base, China

51. Two series of training sessions were held in June and July 2018 for representatives of ministries, utilities, and regulatory bodies of the 14 WAPP countries to equip them with knowledge and tools on Power Purchase Agreements (PPAs). These workshops covered core topics such as the roles of PPAs in renewable energy projects, pricing, procurement, risks, financial modelling, contractual frameworks, and negotiations. These series of training sessions were instrumental in identifying the areas that require further support and served as a basis for the follow-up capacity building activities in the region for the next three years.

52. In October 2018, a regional consultative meeting on the Africa Clean Energy Corridor was organised in partnership with the SADC Centre for Renewable Energy and Energy Efficiency (SACREEE) and the Common Market for Eastern and Southern Africa (COMESA) and hosted by the Government of Namibia. Gathering 75 representatives from ministries, utilities and regulatory bodies of the Eastern and Southern African power pools as well as regional institutions and international partners, the meeting provided an opportunity for taking stock of the accomplishments so far made under the initiative and discussing potential areas of co-operation in the next phase of implementation of the ACEC, such as, planning and operation of grids with higher shares of variable renewable energy, renewable energy policy support schemes and power purchase agreements.

53. **Central Africa.** Upon the request of the Secretariat of the Economic Community of Central African States (ECCAS) to support the region in developing a strategy for a sustained deployment of renewable energy technologies, IRENA has been assisting with the development of a Regional Renewable Energy Roadmap. This Roadmap comprising six main pillars of: (i) resource assessment, (ii) energy data, (iii) long-term energy planning, (iv) enabling policy and regulatory frameworks for investments (v) renewable energy project development and finance, and (vi) institutional set-up and

IRENA's contributions to the WAPP masterplan updates

Since January 2018, IRENA has engaged in supporting WAPP through updating the ECOWAS masterplan. IRENA's System Planning Test model for **West Africa** (SPLAT-W) was updated with new results incorporated in the report entitled *West Africa: Planning and prospects for renewable energy*, published November 2018. Insights from the analysis were shared and discussed with the WAPP leadership and the technical service provider responsible for the WAPP masterplan update. As a result of the close co-operation with the WAPP Secretariat and relevant stakeholders, IRENA's work was used extensively for the updated regional power sector masterplan prepared by WAPP. The plan displays high ambition in low-cost solar PV deployment and overall levels of renewable energy generation in flexible, well-interconnected national systems by 2030.



After several rounds of consultation and validation at technical level, the ECOWAS Revised Master Plan for the Generation and Transmission of Electrical Energy was adopted and endorsed at Ministerial and Heads of State level in December 2018.

skill development across the renewable energy value chain has been validated at technical level by representatives from ministries in charge of energy and environment of the region in November 2018 in Kigali, Rwanda. ECCAS will submit the document for adoption at Ministerial level and endorsement by the Heads of State of the region in the first half of 2019.

54. The System Planning Test (SPLAT model) has been updated and refined for the **East and Southern African** Power Pool regions. The results of the modelling and scenario runs will be summarised in a study, a graphical preview of which will be presented at the ninth Assembly of IRENA in January 2019. The study aims to provide an input to the PIDA process and the updating of the regional Power Pool Masterplans for East and Southern Africa. Furthermore, at the request of the Secretariat of the Economic Commission of **Central African States**, IRENA undertook a regional SPLAT analysis and provided inputs for the development of a regional action plan.

55. IRENA is also deepening its assessment of bioenergy in Africa; the Agency's published studies on Biofuel Potential in Sub-Saharan Africa and Bioenergy Potential from Degraded Land in Africa will be joined by reports on rural bioenergy solutions, food, and fuel potential from nitrogen-fixing wood crops, and sustainable potential for scale up of bioenergy from sugarcane in Africa. Much of IRENA's work on bioenergy is supported on an ongoing basis by the Government of Japan.

56. **Clean Energy Corridor of Central America (CECCA).** In May 2018, in the context of the Central American Integration System's (SICA) Directors of Energy meeting, the Agency presented outcomes from its regulatory and technical projects in Panama, namely on the design of solar PV and wind power PPAs in Panama, power system operations, and simulation software for variable renewable energy (VRE) integration. Based on feedback received, support on VRE grid integration and renewable energy PPAs will be expanded to other CECCA countries. IRENA is currently undertaking a regional consultative process to define further activities under CECCA. IRENA also participated in the Council of Ministers of Energy of the Central American Integration System (SICA) on 6-7 December 2018 in Belize to present the work that has so far been carried out under the CECCA initiative. The meeting provided an important opportunity to present and discuss the potential areas of future focus during the next phase of implementation of CECCA.

57. In the framework of the Energy Congress of Central America (COREN) that took place on 22-24 August 2018 in El Salvador, IRENA organised a CECCA panel of Ministers and senior officials from Central America. The objective was to discuss the main challenges of scaling up renewables in the regional electricity market and identifying potential solutions. This discussion also focused on how the CECCA initiative can build upon its past technical and regulatory work to best support future work. This panel also contributed to the ongoing consultative process with Central America.

58. The Agency held a training, in partnership with GIZ and in collaboration with the Regional Operator Entity (EOR) of Central America, for national and regional power system operators and officials in the region (El Salvador, December 2018). The aim of the training was to build capacity in the areas of planning, operating and maintaining power systems with higher shares of variable renewable energy (VRE), particularly through the use of network simulation software. The four-day course provided deep technical discussions on the underlying concepts and parameters of VRE models for grid studies and their specific applications in Central America.

59. **Latin America.** The *Abu Dhabi Communique on Accelerating Renewable Energy Uptake in Latin America*, adopted during IRENA's fifth Assembly in 2015, and the findings of the 2016 IRENA Renewable Energy Market Analysis for Latin America, continue to guide engagement in the region. In August 2018, in the framework of the Latin American Energy Organisation's (OLADE) Experts Meeting, IRENA organised a workshop on opportunities for accelerating the energy transformation in Latin America. Following this meeting, IRENA initiated a consultative process with countries of the region with the objective to develop relevant activities in line with the Agency's mandate, building on the previous work resulting from the Communique adopted in 2015.

60. IRENA organised the Renewable Energy Day in the framework of the Energy Congress of Central America that took place in Ecuador in August 2018. The Congress was attended by approximately 300 participants from governments, public entities, private sector, energy utilities, and academia. IRENA organised panel sessions on Renewable Energy Trends, Geothermal Energy in Central America, Renewable Energy Project Development and Finance, and Geothermal Direct Use Applications.



Regional Workshop on Renewable Energy Deployment in Latin America, Ecuador, August 2018

61. IRENA organised the Renewable Energy Day during the OLADE Energy Week on 10-14 December 2018. Bringing together high-level energy officials as well as experts from Central and South America, regional and international partners (including IDB, ECLAC, OLADE, and GIZ), national industry associations, utilities and private sector from Latin America, the event featured discussions on planning and promotion of renewables as well as innovation in renewable energy technologies. IRENA also presented its work in various sessions of the Energy Week on energy access, regional integration, and business opportunities for renewables development.

62. **Central Asia.** As guided by the Astana Communique on *Accelerating the Uptake of Renewables in Central Asia*, IRENA advanced the implementation of the regional action plan through two activities. First, a three-day Technical Training on Renewable Energy Statistics took place in September 2018 in Abu Dhabi, UAE. The training targeted energy statisticians from Central Asia with a goal to improve capacities to enhance the availability and quality of national renewable energy statistics in the countries of the region. Furthermore, IRENA organised a Regional Workshop on Policy Support Mechanisms in Central Asia in October 2018 in Baku, Azerbaijan, for participants to share experiences and discuss the latest global trends in renewable energy auctions and the design elements.

63. IRENA, at the invitation of the Eurasian Council on Foreign Affairs (ECFA), provided detailed expert contribution to ECFA's special report on the EU's new strategy for Central Asia. The report, which is the synthesis of expert contributions from fifteen international institutions including IRENA, the United Nations, and the EBRD, among others, seeks to inform the European External Action Service (EEAS) as it considers its new Strategy for Central Asia for 2020 - 2027. With the adoption of the Astana Communique on *Accelerating the Uptake of Renewables in Central Asia*, IRENA has been actively engaging with the countries of the region to support their growing interest in diversifying the energy mix and accelerating the deployment of renewables.



Regional Workshop on Policy Support Mechanisms in Central Asia in October 2018 in Baku, Azerbaijan

64. **South East Asia.** The Association of Southeast Asian Nations (ASEAN) and IRENA signed a Memorandum of Understanding (MoU) to support the scaling up of renewable energy in the region at the 36th ASEAN Ministers on Energy Meeting (AMEM) and Singapore International Energy Week (SIEW) in Singapore in October 2018. Key priorities to implement the MoU, as outlined in the Action Plan, have been identified as energy planning, development of a regional RE roadmap, policy and regulatory frameworks to support RE deployment, capacity building on RE-related topics, RE technology, innovation, and financing. As a kick-off activity, a Renewable Energy Policy Support Mechanism Workshop was held jointly with ASEAN Centre for Energy (ACE) and hosted by Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC) of Malaysia in Kuala Lumpur on 21-22 November 2018 to support the region's initiatives to move toward a competitive renewable energy market.



ASEAN-IRENA MoU signing ceremony, witnessed by ten ASEAN Energy Ministers, at Singapore International Energy Week, 30 October 2018.



Regional workshop on Renewable Energy Policy Framework for South East Asia, Kuala Lumpur, Malaysia, November 2018.

65. **South Asia.** At a knowledge sharing workshop entitled Modern Techniques including Renewable Energy Auctions for Economizing Renewable Energy Tariff in Colombo, Sri Lanka in May 2018, IRENA delivered a webinar to share global best practices and case studies on the organisation and implementation of reverse auctions for renewable energy deployment development. The workshop was organised by the SEC, an energy centre of the South Asian Association for Regional Co-operation (SAARC), and was attended by government officials and experts from South Asia. Further efforts are underway to discuss and design joint initiatives with the SEC.

66. **South East Europe.** Guided by the Abu Dhabi Communiqué on *Accelerating the Uptake of Renewables in South East Europe*, adopted in January 2017, IRENA conducted a range of activities in the region. In June 2018, IRENA and the Ministry of Mining and Energy of Serbia, co-hosted a regional capacity-building workshop on RE project development and financing. Furthermore, in November 2018, together with the Energy Community Secretariat, IRENA organised a workshop on grid integration of variable renewable energy sources. It gathered more than 70 participants from policy makers, energy regulators as well as transmission and distribution system operators to discuss latest advancements and best practices in various facets of grid integration of those resources. Also, the Agency delivered a webinar for the State Agency on Energy Efficiency and Energy Savings of Ukraine to support the ongoing efforts to design an auction system for renewables.

67. The Agency has supported various regional processes, with its analytical input or participation in discussions. For example, IRENA's report entitled Cost-competitive renewable power generation: Potential across South East Europe influenced the debate on the inclusion of renewable energy into the European Commission-led Central and South Eastern European Energy Connectivity (CESEC) initiative. A regional REmap analysis for the CESEC region is also planned to support its Renewable Energy Action Plan, and a kick-off workshop, building on the discussions held throughout the year, took place on 25 October 2018.

Collaborative platforms

68. Global Geothermal Alliance. IRENA continues to support international co-operation and the development of enabling environment for geothermal energy through the Global Geothermal Alliance (GGA). Following the launch of the initiative in December 2015, the Alliance has expanded its reach to 45 members and 33 partners⁶, with Ethiopia, Germany, Japan, the Mexican Geothermal Cluster (CeMIEGeo), and the Organisation of Eastern Caribbean States (OECS) joining the Alliance in 2018. Building on the outcomes of the Regional Workshop on Geothermal Financing and Risk Mitigation in Africa held in Kenya, in February 2018, IRENA is developing an assessment of the state of play and perspectives for geothermal energy in East Africa. This study will cover different key aspects in the development of geothermal projects for power generation as well as for direct uses of geothermal heat. IRENA is also working on the link between energy and food. In this context, based on the discussions and case studies presented at the event “Geothermal Direct Utilisation and Food Security” (see Box below) held in April 2018, the Agency is developing a publication with focus on lessons and recommendations to scale up the adoption of geothermal heat in food and agriculture.

69. In collaboration with the World Bank’s Energy Sector Management Assistance Program (ESMAP) and the International Geothermal Association (IGA), IRENA is working on a project aiming to enrich the geothermal component of IRENA’s Global Atlas and promote standardisation in the way resource assessment for geothermal energy is conducted, reviewed and reported. This involves training local public authorities and stakeholders, inventorying geothermal fields and classifying the resource estimates in four countries/regions according to the internationally endorsed guidelines of the United Nations Framework Classification (UNFC). To this end, data gathering and training sessions were held in Indonesia in March 2018 and in Saint Lucia in December 2018, the latter organised in collaboration with the OECS and Caribbean Development Bank and covering a cluster of Caribbean islands. A similar technical session will take place in Ethiopia in February 2019. IRENA’s work on GGA and geothermal energy deployment is supported by the Governments of France, Iceland, Japan, and Switzerland.

⁶ **Member Countries:** Argentina, Bolivia, Burundi, Chile, Colombia, Comoros, Costa Rica, Djibouti, Ecuador, Egypt, El Salvador, Fiji, France, Germany, Guatemala, Honduras, Iceland, India, Indonesia, Italy, Japan, Kenya, Kingdom of the Netherlands, Malaysia, Mexico, Nicaragua, New Zealand, Pakistan, Papua New Guinea, Peru, Philippines, Poland, Portugal, Romania, Saint Vincent & the Grenadines, Switzerland, Solomon Islands, United Republic of Tanzania, United States of America, Tonga, Turkey, Uganda, Vanuatu, Zambia, Zimbabwe.

Partner Institutions: African Development Bank, African Union Commission, AGH University of Science and Technology (Poland), Andean Geothermal Center of Excellence (Chile), Association GeoEnergy Celle e.V. (Germany), Canadian Geothermal Energy Association, Centro Mexicano de Innovación en Energía Geotérmica (CeMIEGeo), Eastern African Power Pool, Energy Institute Hrvje Požar (Croatia), European Geothermal Energy Council, GEODEEP - Geothermal Cluster for Heat and Power (France), Geothermal Resources Council (USA), Geothermal Power Plants Investors Association (Turkey), Iceland GeoSurvey, Iceland Geothermal Cluster Initiative, Inter-American Development Bank, International Geothermal Association, International Renewable Energy Agency, Islamic Development Bank, Macedonian Geothermal Association, National Energy Authority (Iceland), New Partnership for Africa’s Development, Nordic Development Fund, Organization of American States, Organisation of Eastern Caribbean States, Regional Center for Renewable Energy and Energy Efficiency, Serbian Geological Society, Southern Africa Power Pool, Pacific Community, United Nations Environment Programme, United Nations University - UNU GTP, United States Energy Association (USA), ESMAP/World Bank.

IRENA, in co-operation with the Ministry for Foreign Affairs of Iceland and the Iceland Geothermal Cluster Initiative, organised a GGA meeting on *Geothermal Direct Utilisation and Food Security*. The event, held in April 2018, provided the opportunity for some 100 participants to discuss successful experiences, share lessons, and identify partnership opportunities for projects. Amongst other things, experts pointed out that dedicated policy and regulatory frameworks for direct uses are a pre-requisite to attract the private sector and that governments can facilitate the establishment of partnerships between local authorities and industrial operators. The main outcomes emerging from this event were presented at the fifth Geothermal Congress for Latin America and the Caribbean (GEOLAC) in July 2018 at the fifth Energy Congress for Central America (COREN) in August 2018, and at the Seventh African Rift Geothermal Conference (ARGeo-C7) in November 2018. The main lessons and recommendations emerged in this framework will be the basis for the development of a publication to be launched in the first quarter of 2019.



70. SIDS Lighthouses Initiative. Since 2014, IRENA has consolidated its work with SIDS under the umbrella of the SIDS Lighthouses Initiative (LHI), comprising 36 SIDS⁷ and 22 development partners⁸. The Organisation of Eastern Caribbean States, the Solar Head of State and the Pacific Islands Development Forum recently joined the Initiative. The SIDS partners of LHI accounted for about 2.75 GW of the renewable energy capacity in 2017, of which more than 400 MW were installed between 2014 and 2017. In this context, more than 250 MW of solar PV and 50 MW of wind have been installed since the launch of LHI, and over USD 500 million has been mobilised for renewable energy investments. Therefore, LHI's installed capacity and funding mobilisation targets for 2020 have successfully been met and exceeded three years ahead of schedule.

71. Building on these results and taking into consideration the evolution of the energy context in the SIDS, a consultation process was undertaken with LHI partners to identify the priority areas and targets of the next phase of the Initiative. SIDS Lighthouses Initiative 2.0 (LHI 2.0) was launched at a High-Level Roundtable held on 28 September 2018 at the UN General Assembly (UNGA).

⁷ Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, British Virgin Islands, Cabo Verde, Comoros, Cook Islands, Cuba, Dominican Republic, Micronesia (Federated States of), Fiji, Grenada, Guyana, Kiribati, Maldives, Marshall Islands, Mauritius, Montserrat, Nauru, New Caledonia, Niue, Palau, Papua New Guinea, Saint Lucia, Saint Vincent and the Grenadines, Samoa, Sao Tome and Principe, Seychelles, Solomon Islands, Tonga, Trinidad and Tobago, Turks and Caicos, Tuvalu, Vanuatu

⁸ European Union, France, Germany, Italy, Japan, New Zealand, Norway, United Arab Emirates, United States of America, Indian Ocean Commission, IRENA, Association of the Overseas Countries and Territories of the European Union, United Nations Development Programme, World Bank, Enel, Clean Energy Solutions Center, Clinton Climate Initiative, Rocky Mountain Institute-Carbon War Room, Sustainable Energy for All (SEforALL), Organisation of Eastern Caribbean States (OECS), Solar Head of State.

SIDS Lighthouses Initiative 2.0: Accelerating the energy transformation through renewables

Despite the remarkable renewable energy resources in SIDS, more action is needed to harness the benefits of a renewables-based energy transformation. SIDS are actively considering the new developmental options, which are also enabled by their Nationally Determined Contributions (NDCs). Accordingly, the Initiative will build on its progress to date and respond with a holistic approach not only to the transformation and development of the power sector but also to the climate agenda.



High-Level Roundtable SIDS LHI 2.0 with IRENA Director-General, Honorable Tuilaepa Aiono Sailele Malielegaoi (Prime Minister of Samoa), H.E. Hilda Heine (President of the Republic of the Marshall Islands), Honorable Ralph Gonsalves (Prime Minister of Saint Vincent and the Grenadines), Honorable Evelyn Wever-Croes (Prime Minister of Aruba) and H.E. Taneti Maamau (President of Kiribati)

The High-Level Roundtable *SIDS Lighthouses Initiative 2.0: Increasing ambition to accelerate energy transformation in Small Island Developing States* on 28 September 2018 during UN General Assembly high-level meetings in New York. The roundtable was attended by five Heads of State and Government, five Ministers, and senior officials from SIDS, development partners and regional partners to launch the new phase of IRENA's Lighthouses Initiative, Key areas identified and discussed including:

- Support SIDS in reviewing and implementing NDCs, extending technical assistance and capacity building where needed;
- Extend focus beyond power generation to include transportation and other end-use sectors;
- Reinforce and expand engagement of partners, and leverage synergies with other relevant initiatives;
- Strengthen institutional and human capacity development in all segments of the renewable energy value chain;
- Link renewable energy uptake to climate resilience and more effective disaster recovery;
- Support development of bankable projects, fostering access to finance and closer co-operation with the private sector;
- Expand from assessment and planning to implementing effective, innovative solutions, with continued technical and regulatory advisory services to help SIDS overcome their unique challenges;
- Promote all renewable sources, including geothermal and ocean energy, along with stepping up work to integrate solar PV and wind power;
- Leverage synergies between renewables and energy efficiency;
- Reinforce links between renewables and non-energy sectors, including agriculture, food, health and water, to foster broad socio-economic development as well as raising awareness about job creation, gender equality and women's empowerment through renewable energy development;
- Enhance collection and dissemination of data and statistics, supporting informed decision-making and effective monitoring;
- Boost renewable energy power deployment, aiming for a target of 5 gigawatts (GW) of installed capacity by 2023.

72. IRENA also provided technical support to several SIDS, including grid integration studies for the Dominican Republic, Fiji and Vanuatu, finalisation of which is expected in early 2019. In the Pacific, IRENA conducted a stakeholder consultation workshop in Vanuatu on 5-6 November 2018, on the outcomes and analysis of the grid integration studies in the coming months. A project facilitation and finance workshop using the Agency's Project Navigator tool was held in Mauritius in November 2018 for participants from across the Indian Ocean region. Another second Project Navigator workshop was included in the Annual Isolated Power Systems Conference that was held in Hawaii in October 2018 with participants from the Pacific and Caribbean regions. IRENA participated at the Pacific Energy Advisory Group (PEAG) meeting and the Pacific Center for



*Participants of the Capacity Building Training in Fiji,
November 2018*

Renewable Energy and Energy Efficiency (PCREEE) Steering Committee meeting on 19-21 November in Fiji, in preparation for the Pacific ministerial meeting that will be held in Samoa in August 2019. The Agency also undertook training on renewable energy financing for local bankers and shared various financing models with energy planners, regulators and utilities in the Pacific region, on 22-23 November in Fiji as part of the

Association of Development Financing Institutions in the Pacific (ADFIP) Annual General Meeting.

73. In the Caribbean, IRENA conducted a Project Financing Matchmaking Forum held on 7 November 2018, which saw the participation of 10 project developers from 5 SIDS in the region. In response to the call for proposals, the IRENA-ADFD Project Facility received ten applications from nine SIDS, with three projects shortlisted to the second stage of the current ongoing assessment.

74. IRENA, in collaboration with the Aruba Centre of Excellence, organised a workshop to advance energy resiliency and renewable energy deployment in the Caribbean. The workshop took place in Aruba on 28-29 November 2018. Furthermore, the Agency has completed the site appraisals for Nauru and is finalising the worksite appraisal work for Comoros. The Agency finalised the Kiribati Roadmap and is also finalising the development of the Palau Energy Roadmap in partnership with New Zealand. Moreover, IRENA supported the SIDS Renewable Energy Conference on Climate Financing held in Cabo Verde on 22-23 November 2018, which was attended by representatives from SIDS and development partners. IRENA's work on SIDS is supported by the Governments of France, Germany, Japan, the Kingdom of the Netherlands, the Kingdom of Norway, New Zealand, and the United Arab Emirates.



SIDS related workshop meetings for the Pacific, AIMS and Caribbean regions

Multi-stakeholder engagement

75. Continuing to engage a wide group of stakeholders has helped IRENA leverage synergies and better understand the challenges that the transformation of energy brings. The IRENA **Coalition for Action** promotes such an engagement by gathering private sector entities, industry associations, civil society, researchers, and international organisations. The Coalition today has over 80 members⁹ operating through a number of Working Groups. At the eighth session of the IRENA Assembly, the Business and Investors Working Group and its Community Energy Sub-Group launched two white papers entitled ‘*Scaling Up of Renewable Energy Investment in Emerging Markets*’ and ‘*Community Energy: Broadening the Ownership of Renewables*’. During its second Annual Strategy Meeting in January 2018, the Coalition agreed to continue the three Working Groups from 2017 as well as established the ‘Towards 100% Renewable Energy Group’. The Coalition received public recognition at the UN High-Level Political Forum in July 2018 as a high-impact public-private initiative to drive SDG7.

76. Furthering IRENA’s engagement with **parliamentarians**, a focus was placed on strengthening the Agency’s partnership with the Inter-Parliamentary Union (IPU). As an initial step towards the implementation of the recently adopted IPU’s Declaration, *Engaging the private sector in implementing the SDGs, especially on renewable energy*, IRENA actively participated in the 139th Assembly of the IPU in October 2018. At this important event, the Agency engaged with, and identified members of parliament who can provide insights and share their experiences on renewable energy-related issues at the fourth IRENA Legislators Forum to be held on the margins of the ninth session of the IRENA Assembly in January 2019.

⁹ For a list of members please see <http://coalition.irena.org/HOME/Members>.



IRENA Legislators Forum and joint event with FNC at the Eight Session of the IRENA Assembly boost renewable energy deployment through strengthened partnerships

77. IRENA, through the GROWTH@IRENA initiative, engages undergraduate students and gives them the opportunity to undergo training at the IRENA Headquarters during their summer break. This allows them to gain valuable experience in a range of professional areas while learning about renewable energy and offers them an opportunity to engage in IRENA's events and activities. Between 2016 and 2018 the number of student trainees increased to 15. Advancing the focus on youth, the Director-General of IRENA engaged with policy-makers to discuss the involvement of youth in global climate action and renewable energy at the Roundtable on Climate Youth Dialogue organised by the United Arab Emirates and Facebook on the margin of the 73rd session of the UNGA. IRENA strengthened its engagement with youth and invited students from nationally-based schools to participate as volunteers during the sixteenth Council meeting. Further means of engagement with youth are being considered in the upcoming 9th Session of the Assembly and related meetings as well as in other Agency activities. This initiative provides students with an opportunity to gain insights into the work of the Agency and to build and increase their knowledge on renewables and have an understanding of international co-operation.

IV. Source of advice and support

78. Through direct engagement with Members, IRENA has made its knowledge products increasingly policy-relevant and accessible and has refined its tools, platforms, and methodologies to better address common challenges. Building on work to date, IRENA is offering targeted support in project development, access to finance, and resource and readiness assessments. It has further developed its renewable energy solutions lab offering direct support to entrepreneurs and local businesses.

Project support and facilitation

79. Creating a renewable energy project pipeline is one of the priorities for the acceleration of the global energy transformation. IRENA contributes to this with its convening power, expert knowledge, and tools and platforms that facilitate projects. The **Project Navigator** makes an important contribution in this context. In 2018, the Navigator reached a new milestone with more than 6,000 registered users; its global reach has expanded with the translation of its content to Spanish and French. The platform now also includes three new technical modules focusing on biogas, woody biomass, and heating and cooling solutions for cities. Several on-site and remote training sessions were imparted to more than 600 project developers, government officials, and financiers in SIDS, South East Europe, South East Asia, the Middle East, and Sub-Saharan Africa. Additional capacity building activities are being prepared for Latin America and Sub-Saharan Africa in co-operation with international and local partners such as AREI, SACREEE, AUC, IOC, GIZ, UNIDO, and the World Bank. Expansion of the Project Navigator work was possible thanks to the generous voluntary funding from Germany¹⁰, Japan, and Norway.

80. Efforts are being made to translate the information in the **Global Atlas** to support project development. With the Atlas site appraisal service, support has been provided to Comoros, Eswatini, Mali, Nauru, Nigeria, Sudan, Togo, and Zimbabwe to assess the financial pre-feasibility of 45 sites earmarked for renewable energy project development. Financial pre-feasibility will provide a benchmark tariff for the opening of solicited bids within those sites and will allow local authorities and prospective project developers to have a clearer understanding of the economic feasibility and investment needed to develop the sites. In addition, efforts of upgrading and modernising selected elements of the Global Atlas infrastructure and interface for its user base are underway, including the development of conceptual designs to enable visualisation of rooftops in cities and their potential to host solar PV installations. This work is supported through voluntary contributions from France and Germany.

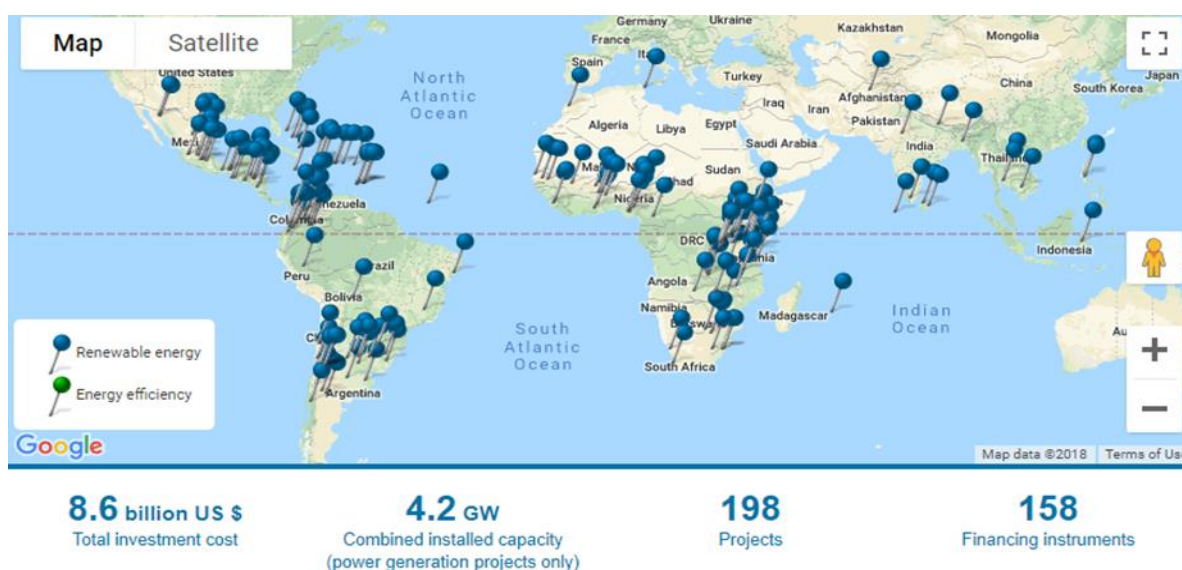
81. IRENA's **Sustainable Energy Marketplace** has continued to serve as an investment catalyst within the sustainable energy space by connecting project developers and owners with financiers, investors, and service and technology providers. With the global coverage and the increase in number of projects and registered financial instruments, the Marketplace is now better positioned to perform its match-making function. The Asia and South East Europe regional hubs of the Marketplace were launched in 2018, respectively at the Asia Clean Energy Forum in Manila, Philippines and at the International Forum on Energy for Sustainable Development in Kiev, Ukraine. The SIDS hub of the Marketplace for the Pacific region was launched at the ADFIP Annual Meeting in Suva, Fiji. Matchmaking events were conducted in the Asia and the Caribbean regions to engage experts from project development companies, financial institutions, service providers and development institutions to interact about their business requirements, financial offerings, and service offerings to support various renewable energy technologies and business models. The matchmaking events have resulted in signing of three preliminary non-disclosure agreements between project developers and financiers, in turn, leading to the initiation of commercial discussions.

¹⁰ As part of the International Climate Initiative (IKI) of the German Government.



Participants of the Marketplace Matchmaking event in Miami, November 2018

82. The Marketplace currently comprises of 198 sustainable energy projects (translating into 4.2 GW of installed capacity and USD 8.6 billion worth of investment opportunities, 158 financing instruments, 205 service providers, and 76 technology suppliers). The projects on the platform include 79 solar, 44 bioenergy, 25 hydropower, 17 wind, and 33 others. The platform also comprises of 158 financing instruments including 64 equity, 22 subordinated debt, 14 grant, 22 senior debt, and 36 other instruments (e.g. guarantees, leasing, results-based financing, and others). The Marketplace is also being upgraded with a risk assessment and mitigation platform, which would include a comprehensive risk mitigation database.



83. IRENA has continued its collaboration with the Abu Dhabi Fund for Development (ADFD) to facilitate project selection and financing of renewable energy projects in developing countries. The IRENA/ADFD Project Facility engaged 69 experts to date to conduct an independent selection process based on set technical, economic/financial, and socio-economic development criteria. The total allocated loans by ADFD amounted to USD 214 million for 21 renewable energy projects in 20 developing countries. Co-financing of USD 420 million from government sources and other development funds has been mobilised to cover the rest of the project costs. These projects are expected to deliver 120 MW of renewable energy and advance sustainable development. Seven of these projects are expected to start generating power in 2019. An added benefit of this collaboration is information and data on some 500 project proposals on development-focused renewable energy projects in developing countries.

84. In the sixth cycle, currently in process, IRENA received a total of 112 applications from 51 eligible developing countries by mid-February 2018. This marks a 25% increase in the number of applications compared to the previous cycle. Around 50% of submissions are solar PV projects in Africa, followed by 30% on bioenergy, and 12% on hydropower projects. A total of 23 applicants submitted full project proposals and 13 were recommended for ADFD funding. Only five of these have a government guarantee. The projects selected during the sixth cycle will be announced during the IRENA Assembly in January 2019. As a result of unutilised and unallocated ADFD funds in previous cycles, there is more than USD 50 million available for developing countries during the seventh cycle. The application process for this cycle was opened in the first quarter of 2018 to allow sufficient time for project preparation, and summary proposals can be submitted online from 12 November 2018 to 14 February 2019.



IRENA and ADFD Directors and Chair of Advisory Committee of the IRENA/ADFD Facility announce the seventh funding cycle during IRENA's sixteenth meeting of the Council in Abu Dhabi

85. IRENA, jointly with the Terrawatt Initiative (TWI), has continued to work on an initiative to standardise project documentation for solar PV. The initiative has been originated from the widely-recognised need for a simplified and streamlined contractual framework to unlock greater investments in solar power. With comprehensive legal documentation solution available freely to the global solar power community, the initiative aims to facilitate project development and finance practices.

Renewable energy solutions lab

86. IRENA continues to assist entrepreneurs to scale up renewable energy enterprises through its Southern African Development Community (SADC) Renewable Energy Entrepreneurship Support Facility. In April 2018, the SADC Centre for Renewable Energy and Energy Efficiency and IRENA launched the first call for applications for SADC-based entrepreneurs to submit requests for assistance under the Facility. The applications have been evaluated and, on this basis, the first training sessions will be held by the end of 2018. In October 2018, on the sidelines of the official launch of SACREEE, IRENA, together with SACREEE and the Government of Namibia, convened a meeting to present the initiative to the representatives of the Ministries of Energy of the 16 SADC countries and to hold discussions about the Facility's activities as well as the expected outcomes for the next two years. The meeting has sought to provide greater visibility to the Facility and to present relevant IRENA products that can contribute to its success.

87. IRENA is also supporting the establishment of a regional certification scheme to strengthen capacity for solar PV deployment in the 15 Member States of the ECOWAS. ECREEE, with technical advice from IRENA, will be piloting the scheme in partnership with selected national examination entities, guided by the ISO 17024 standard and agreed on Job-Task Analysis (JTA) for off-grid solar PV technicians. Presently, the curricula of 21 training institutes from eight ECOWAS countries is under review for alignment with the JTA.

88. Mainstreaming gender in the energy transformation is a critical pillar of advancing the 2030 Agenda for Sustainable Development, especially in the achievement of SDG7 on energy. In recognition of this, IRENA has undertaken concerted efforts across three main areas: improving the knowledge base on the current status of women's participation in the renewable energy sector, informing policy-making that is aligned with the principles of gender equality, and advocating the importance of integrating the gender perspective within the energy transition discourse. IRENA has shared findings from its analytical work on gender at the Vienna Energy Forum, EU Sustainable Energy Week, and the Knowledge Building on Women in the Clean Energy Workshop hosted by Italy in collaboration with the C3E TCP and the IEA.

89. IRENA conducted a global online survey¹¹ of individuals and organisations across the renewable energy sector to gather quantitative and qualitative insights on women's participation in the sector. Nearly 1,500 responses were received and the findings will be integrated into IRENA's first dedicated publication on the topic, which will be presented at the Assembly in January 2019 during a dedicated evening event on Gender in the Energy Transformation.

Local solutions and tailored advice

90. IRENA's extensive knowledge products, tools, and methodologies provide a sound basis for tailored advice to countries and IRENA's engagement on the ground. Its various frameworks, such as renewable readiness assessments, resource assessments, planning, and socio-economic models, provide countries with clear recommendations on how to achieve their ambitions. IRENA's work on policy assessments and socio-economic benefits is integrated into regional policy workshops for Central Asia and South East Asia.

91. IRENA provides energy planning support to several countries. For example, IRENA worked closely with a team of national staff to develop the Eswatini Energy Masterplan 2034. Upon its launch in October 2018, this plan has now become the official national energy plan, which features "100% renewable power" as the preferred scenario. In Sierra Leone, IRENA supported capacity building to national working team through three training courses on modelling and scenario development. Based on the training, the national working team, co-ordinated by the Ministry of Energy, has developed a draft national energy master plan report to 2040. This report will be expanded and further revised based on refinements to the IRENA SPLAT Sierra Leone (SPLAT-SL) model and the national energy planning scenarios. The government considers this as one of their flagship projects, as shown in the government's web-site¹². This work was enabled by voluntary contributions provided by the Government of Norway.

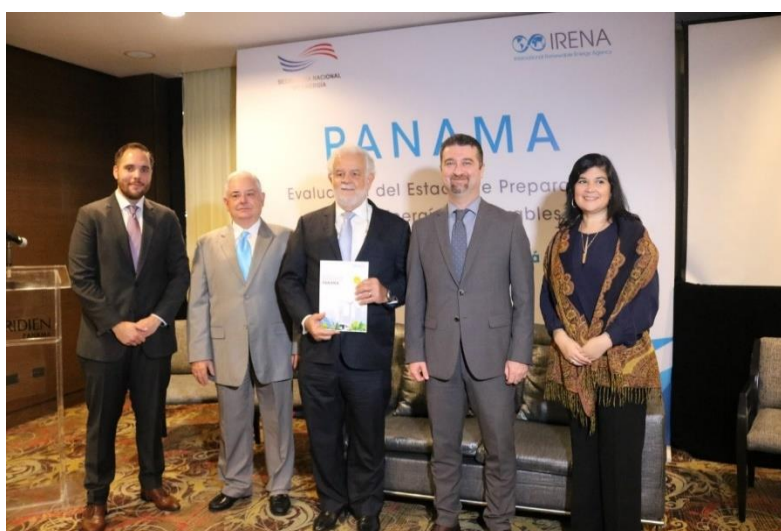
92. IRENA, in co-operation with UNESCWA, has expanded the country assessment of renewable energy manufacturing potentials to Jordan, Lebanon, and the United Arab Emirates. This report analyses the supply chains for renewable manufacturing in terms of technical skills, manufacturing processes, industrial capacity extensions, enabling policies and incentives, local and regional market investments, and financing infrastructures. The study was launched on 26 September 2018 during the International Beirut Energy Forum.

¹¹ www.irena.org/gendersurvey

¹² <http://www.energy.gov.sl/international-renewable-energy-agency-conducts-in-country-energy-planning-capacity-building-for-energy-sector/>

93. The Renewable Readiness Assessment (RRA) report for Pakistan has been released in Islamabad in April 2018. IRENA's assessment presents options for Pakistan to strengthen its policy, regulatory and institutional framework for renewables. It suggests ways to strengthen renewable energy targets, examines the constraints of existing grid infrastructure, highlights the best mechanisms to reduce costs and ease technical challenges, and underlines the potential for private investment in renewables for off-grid and rural electrification.

94. The Agency launched the RRA for Panama in May 2018. Undertaken in conjunction with the pilot projects of the Clean Energy Corridor of Central America (CECCA) initiative, the report recommends assessing renewable energy PPA structures and improving power system planning and operations to accommodate higher shares of VRE in line with Panama's National Energy Plan 2015-2050, which aims to supply 70% of the national energy mix through renewables by 2050. The high-level event took place in Panama City and included government officials from various institutions, representatives from industry and academia, and development partners.



Launch of RRA Panama with Secretary of Energy Dr. Victor Carlos Urrutia

95. The RRA process for Mali and the Republic of Moldova has recently been completed and the reports are under finalisation with the planned launches in Q1 2019. IRENA has also advanced the development of the RRA analysis in Azerbaijan through expert consultation workshops and RRA validation workshops in Baku. Similarly, in Tunisia, the validation workshop was conducted in June 2018 regarding the consolidation of the RRA recommendations. Four new country assessment processes were also initiated: RRAs for Bhutan and El Salvador and combined RRA-REmap for Lebanon and South Korea. The RRA work is in part supported by the Government of Japan and Norway.

96. IRENA is currently engaged with Mozambique to support the work in high-priority areas such as grid integration studies and site assessments. Grid integration studies will help the utilities to assess the capability of the electric grid to accommodate the planned renewable energy resources using grid simulations and appropriate modelling methods. The site appraisal service will be used to screen sites earmarked for solar and wind development using robust power generation and financial models.

97. The development of the Renewable Energy Roadmap 2030 for South Africa is in progress. A national stakeholder review meeting for the REmap South Africa draft study was held in Pretoria on 26 September 2018. The workshop was attended by around 40 national stakeholders, who provided extensive feedback to the study team regarding the national REmap analysis. In November 2018, a national review and validation meeting was organised by the Department of Energy and attended by key national energy sector stakeholders. Based on the rich stakeholder review and inputs, the study will be finalised in Q1 2019.

98. In January 2018 IRENA launched the first joint RRA and REmap report, Renewable Energy Outlook: Thailand. The report was developed in collaboration with the Department of Alternative Energy Development and Efficiency (DEDE) of the Thai Ministry of Energy. The report indicates that Thailand could reach 37% renewable in total final energy while reducing energy costs – saving some USD 8 billion per year with the environmental and health-related costs of fossil fuels taken into account.

IRENA Analysis Finds that Egypt Could Meet More than 50% of its Electricity Demand with Renewable Energy

The Renewable Energy Outlook for Egypt, based on integrated RRA and REmap analyses, was launched on 9 October 2018. The report was prepared by IRENA in close collaboration with Egypt's Ministry of Electricity and Renewable Energy and the New and Renewable Energy Authority.

The Outlook demonstrates that Egypt can maintain economic growth, sustainability, and energy security, whilst ensuring private-sector engagement, by defining the policy, institutional, market, and skills challenges to enabling renewable energy technologies. The report also highlights the actions needed to meet or even surpass Egypt's ambitious targets of 20% and 42% renewable electricity generation by 2022 and 2035, respectively. The country has the potential to generate up to 53% of its electricity from renewable sources by 2030 and pursuing this route could also reduce the country's energy bill by up to USD 900 million annually in 2030. Achieving the higher targets would, however, require investment in renewables to grow from USD 2.5 billion per year based on today's policies to USD 6.5 billion per year.



Director-General meets Egyptian President Abdel Fattah el-Sisi to discuss Egypt's Energy Future

Photo Credit: Office of the Egyptian President

V. International co-operation and strategic engagement

99. With many parts of the global energy system in flux, no single actor can anticipate what the future holds. National policies and international commitments are redrawing the existing energy landscape, reflecting changing aspirations, priorities, and plans. Rapid innovation is redefining the complex network of stakeholders throughout the global economy. Regional production profiles are shifting, sometimes at a rapid pace and with a profound impact on geopolitical dynamics. As requested by Members, the Agency continues to provide leadership in global agenda-setting on energy transformation.

International co-operation and strategic management

100. Following the accession of Chad, Costa Rica, and Turkmenistan since 1 April 2018, IRENA's global family now includes 159 Members and 24 Signatories and States in Accession. This ever-increasing global reach is enabling the Agency to draw on a broad and extensive range of country-level knowledge and expertise for the implementation of its mandate in promoting the global energy transformation.

101. Participation in, and collaboration with, various global, regional, and national fora is the backbone of this effort. IRENA, led by the Director-General, has contributed to a range of global convenings to help shape the global discourse on energy. These occasions are often used to convene IRENA Members and other stakeholders around issues of common interest. For instance, on the margins of HLPF, the Director-General co-hosted a High-Level Dinner on Sustainable Renewable Energy at the Heart of the SDGs, along with UN DESA and the co-chairs of the Group of Friends of Sustainable Energy, Denmark, Norway, and Pakistan. The dialogue brought together government and business leaders and entrepreneurs to discuss the transformative power of renewable energy. The Director-General also contributed to the first Climate Vulnerable Forum Energy Dialogue, convening some 30 countries that are raising their climate ambition through accelerated deployment of renewable energy.



102. Multilateral, regional, and thematic meetings provided many opportunities for targeted input, sharing of knowledge, and forging partnerships. For instance, at the G7 Energy Ministers' Meeting in Halifax, Canada, the Director-General engaged in a range of discussions including: the development of the offshore wind sector, energy transformation in SIDS, and the importance of gender equality in the energy sector. At the request of Argentina as the G20 presidency, IRENA also provided input to the G20 work on energy, sharing the latest information on renewables, including finance and innovation trends. Innovation and investments were prominent themes also at CEM9 and the 3rd Mission Innovation Ministerial (MI3) hosted by Denmark, Finland, Norway, Sweden, the European Commission, and the Nordic Council of Ministers in May 2018. On the sidelines of the event, IRENA and Mission Innovation signed a letter of intent to frame collaboration and joint activities. In October, the Director-General participated in the 2018 International Forum on Energy Transitions, co-hosted by the National Energy Administration of China, IRENA and the Jiangsu Provincial Government, where his engagements focused on critical issues for the energy transformation such as power sector transformation, international cooperation, leadership, and the role of energy for improving livelihoods and advancing sustainable development.



103. At the invitation of Members, the Director-General also engaged in several multi-lateral and multi-stakeholder conferences, such as: the Renewable Energy - XXI Century: Energy and Economic Efficiency in Moscow, Russia (June 2018); the RES4MED and Africa Annual Conference in Rome, Italy (June 2018); the Fifth High-Level Group meeting on Central and South Eastern Europe Connectivity (CESEC) in Sofia, Bulgaria (June 2018); and the ONS Conference 2018, a biennial gathering of the global oil and gas industry in Stavanger, Norway (August 2018). As a member of the Global Commission on the Geopolitics of Global Energy Transformation, the Director-General also participated in its four meetings held in Berlin, Oslo, Reykjavik and Abu Dhabi. These meetings gathered public and private sector leaders and technical experts who shared their perspectives on the ongoing energy transformation. The output of these discussions will be a Commission report to be presented at the ninth Session of the IRENA Assembly. The work of the Commission is enabled by voluntary contributions from Germany, Norway and the UAE and also supported by the Kingdom of the Netherlands. In November, the Director-General also delivered this year's Sussex Energy Group Keynote Lecture, where provided an overview of the on-going energy transformation and discussed with researchers and students how renewables are disrupting the energy sector as well as the key role of the research community in this context. At a Conference held in Kenya on December 6th to launch the country's electrification strategy, the Director-General delivered keynote remarks highlighting the central contribution of renewables, in particular off-grid renewable energy solutions to meeting the country goal of achieving universal access to electricity by 2020. The Director-General attended in December a conference in Rome marking the 10th anniversary of ENEL Green Power. He made keynote remarks at the conference providing an overview of the evolution of renewables worldwide and emphasising the critical role of the private sector in advancing the energy transformation.

104. IRENA is also actively engaged in the global effort on climate change. This includes a contribution to the preparatory process for the UN Secretary-General's 2019 Climate Summit and support to the Global Climate Action where IRENA serves as the energy focal point in the UNFCCC setting. IRENA hosted a series of events at the COP24 in Katowice, Poland and contributed to numerous country and other partners' efforts. The Agency has become a member of the NDC Partnership to align its efforts with these of countries and institutions participating in the initiative. IRENA has also accepted the invitation from Denmark to be an institutional partner in its newly established Clean Energy Investment Coalition.

105. Member engagement in the Agency also continues through the regime of Permanent Representatives (PRs). There are currently 49 PRs accredited to IRENA including Argentina, Panama, Saint Lucia, Serbia, and Switzerland that have been newly accredited.

Governing body meetings

106. Over the last year two meetings of the IRENA Council and related side events were held in May, and November 2018, at the Agency's Headquarters in Abu Dhabi, with attendance per meeting of about 300 delegates from around 100 countries and the European Union. Plenary discussions, side events, workshops and Committee meetings provided delegates with the opportunity to discuss current topics on the global energy transition, and provide guidance to the Agency on policy, programmatic, and governance matters. Preparations for the ninth session of the Assembly are underway.

107. Since its establishment at the second session of the IRENA Assembly, the Fund for Developing Country Representatives (FDCR) has been an important factor in ensuring a high level of inclusiveness, ownership and transparency in the activities of the Agency by facilitating the participation of representatives of Least Developed Countries and SIDS in the Assembly and Council meetings. Since the beginning of the year, the FDCR supported the participation of 75 delegates in different meetings of the governing bodies. However, the Fund, which is exclusively based on voluntary contributions from IRENA Members, could continue to face shortfalls and Members are encouraged to replenish it through voluntary contributions.

VI. Efficient, transparent and innovative management

108. The achievement of IRENA's strategic objectives relies on its responsiveness, effectiveness, internal capacity, and institutional efficiency. IRENA continues to apply dynamic, innovative, and results-focused solutions in its management and administration of the Agency's resources, underpinned by transparency and accountability as hallmarks of an open institution.

Strategic management

109. The planning and organisation of IRENA's governing body and programmatic meetings has been consolidated and streamlined to facilitate efficient organisational delivery. A centralised approach assists in ensuring consistency and resource efficiency and facilitates the monitoring of implementation. Furthermore, the Agency has increased its efforts to strengthen an active engagement of Members during IRENA's governing body meetings through the enhancement of the IRENA Meeting Mobile Application. The Agency has also taken active steps to increase the environmental sustainability of its meetings and its operations, including engagement with partners and service providers to evaluate the success of current measures and to identify new options, while ensuring that its programmatic meetings are environmentally sustainable. Examples include the reduction of printing at the fifteenth meeting of the Council by 23.6% compared to the previous meeting. This was achieved by further developing tools to make documents available electronically.

110. IRENA has intensified its outreach to identify potential partners that could contribute to the diversification of its resource base. To this end, IRENA is gaining a systematic overview of the strategic priorities of different countries to better connect them with the Agency's medium-term strategic objectives. The Agency is also reviewing options for the creation of the Renewable Acceleration Fund based on examples and best practices that can be found in other organisations. To this end, discussions are ongoing with a number of countries to secure support for the programmatic implementation. Internally, a system for monitoring voluntary contributions has been put in place to ensure timely reporting and efficient management.

111. Demonstrating the impact of IRENA's work is vital for its long-term direction and priority setting as well as for diversification of its resource base. Such is reflected in the currently prevailing legislative context of the Agency that places importance on the delivery of fewer but more sharply articulated programmatic activities, which aim for discernible impact. IRENA is implementing a monitoring and evaluation system that is agile, while remaining consistent with its size and capacity. At present, this work involves the identification and collection of data in relation to the implementation of programmatic activities with systematic collection across the Agency. Once fully in place, the monitoring and evaluation system will also support the Agency's internal decision-making processes and enable continuous improvement. The extent to which IRENA can achieve this objective depends on the resources available to this designated line of work.

112. The Legal Office continues to provide support in the conduct of the Agency's activities by reviewing contracts for the procurement of goods and services as well as voluntary contribution agreements and other agreements with governmental, inter-governmental, and non-governmental entities, and by advising on the application of IRENA regulations, rules, and procedures. The Office also continued to support the negotiation of a Supplementary Agreement to the Headquarters Agreement with the United Arab Emirates concerning IRENA's occupancy of its permanent headquarters in Masdar City.

113. Internal audits are carried out to ensure that internal controls are in place and effective across the Agency. The objective of the audit work is to assess whether the activities under review are in line with the principles of efficient, effective and economical use of the Agency's resources. During 2018, this included the reporting of audits on general operating expenses and fixed assets physical count. Likewise, as part of the Audit Plan for the Work Programme 2018-2019, an audit of the general operating expenses for maintenance of information and communications technology and other office

equipment is underway. Internal audits are carried out independently and objectively to help management enhance governance, risk management, and internal control systems.

114. The logistical planning of IRENA's programmatic and governing body meetings has been consolidated and streamlined to facilitate efficient organisational delivery in the implementation of the Work Programme and Budget 2018-2019. Support was provided to events in 35 countries across 5 regions.

Administration and Management Support

115. The Administration and Management Services support efficient implementation of the work programme and facilitate the effective use of the Agency's resources. IRENA continues to innovate in its business processes and practices to remain responsive to the dynamic nature of its programmatic work. In this regard, the implementation of the ERP system since January 2018 will go a long way to facilitate timely and streamlined support to programme implementation.

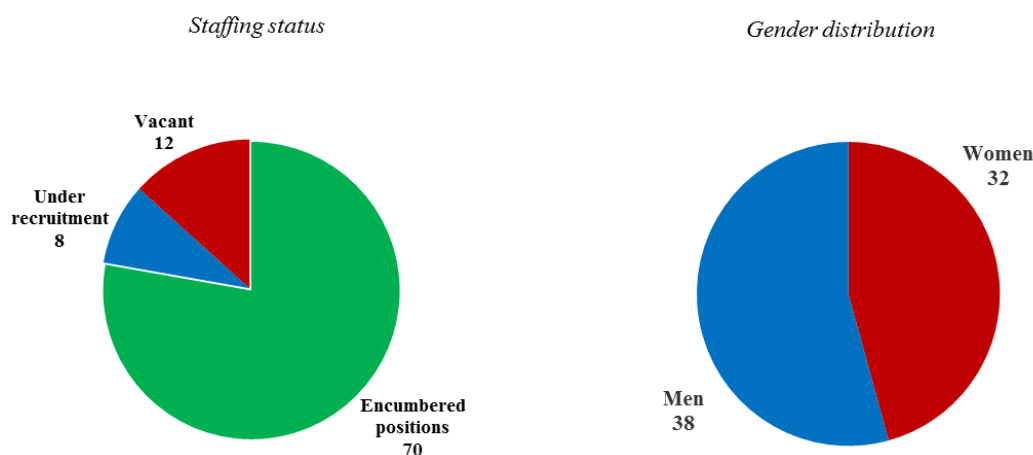
116. **Finance and budget.** The Agency's full compliance with its Financial Regulations and Procedures in accordance with the International Public-Sector Accounting Standards (IPSAS) underpins finance and budget activities. Financial and budgetary services were provided to Members, staff, and other stakeholders, aligned with international accounting standards and budget practices. The services included preparation of the financial statements for IRENA and the Staff Provident Fund, issuance of annual bills and regular follow-up with Members for the collection of outstanding assessed contributions, registering and allotting voluntary contributions, settlement of vendor and supplier invoices, and regular internal support services including payroll, budget utilisation updates, and general advice to support the sound financial management of the Agency. Additional activities included support for addressing internal and external audit recommendations and extensive efforts associated with going live with the ERP implementation.

117. **Information and Communication Technology (ICT).** ICT continues to serve as a strategic enabler and tool for the Agency in the implementation of its Work Programme by providing state-of-the-art IT services and solutions to IRENA business units. ICT is regularly maintaining and consolidates its IT capabilities through initiatives for infrastructure modernisation (both at HQ in Abu Dhabi and in the Bonn Office, on cloud and premises), strengthening operational excellence (IT governance, cost optimisation, regular monitoring), and internal capacity building (training and workshops). ICT is strengthening its roles as a driver of digital transformation towards higher institutional effectiveness and efficiency (through the implementation of the ERP and the use of other processes/document management tools). An enabler of the development of value-added business capabilities on RE through the development and enhancement of IT platforms and applications on RE, ICT continues to be a main pillar of the organisational resilience and compliance through the implementation of cybersecurity management framework and the business continuity plan.

118. **Human Resources.** Human resources spanned administrative, operational, and strategic activities. Significant effort was placed on aligning human resource policies and processes more closely with the Agency's strategic and programmatic objectives, including additional personnel sourcing and building organisational capabilities that are needed to achieve the Agency's operational objectives with the right combination of skills, knowledge, competencies, and expertise, while promoting geographical, cultural, and gender diversity. Human resource practices, rules, and procedures have continued to be refined and updated to ensure effective and efficient responsiveness to the emerging and evolving needs and challenges of the Agency while safeguarding its core values and principles.

119. Attracting, developing, and retaining highly qualified staff is key to the Agency's success. In this respect, IRENA has stepped up its outreach efforts to attract talent from all over the world, including tapping into Members' expertise, and through the mechanisms provided by the decision of

the Assembly at its second session (A/2/DC/5) such as loan arrangements and Junior Professional Officer Programme. During the period from 1 January 2018, 24 vacancies (core and project) were announced and over 2200 applications received. Out of 90 core posts, 78 are filled or under recruitment (70 filled and 8 under active recruitment) and twelve are vacant. The 70 staff are from 40 nationalities out of which 46 % are women and 54 % are men.



Approved and filled/under recruitment posts by level

Level	Approved	Filled or Under Recruitment
ASG	1	1
D-2	1	0
D-1	5	2
P-5	17	15
P-3/4	37	34
P-2/1	3	2
Sub-total Professional and above	64	54
General Services	26	24
Total	90	78

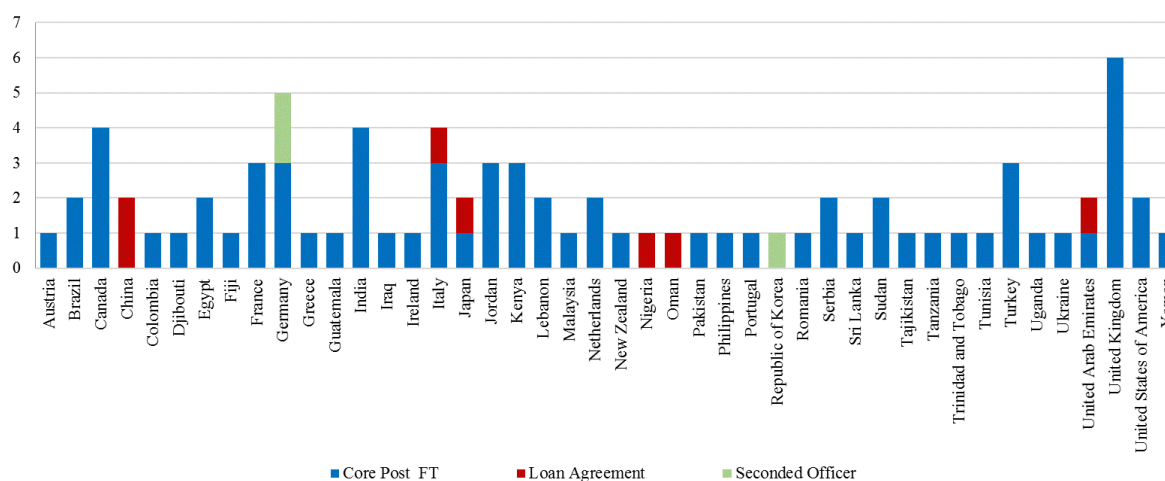
Loaned Personnel

Division	Title	Loaned from
SMED	Liaison and Protocol Officer	UAE
SMED	Advisor - Outreach and Communications	UAE
IITC	Bioenergy Analyst	Japan
IITC	Programme Officer, Remap Engagement	Nigeria
IITC	Programme Officer, Quality Assurance and Standards	Germany
IITC	Programme Officer, State Grid Corporation of China	China
CSP	Programme Officer, State Grid Corporation of China	China

Seconded Officers (Voluntary Contributions)

Division	Title	Seconded Officers from
KPFC	Associate Programme Officer - Policy	Germany
IITC	Associate Programme Officer - Energy Planning	Germany
CSP	Programme Officer	Republic of Korea

Geographical distribution (core posts, loaned personnel and seconded officers)



120. Procurement. The Agency has continued to implement its planning for cost-effective procurement of goods and services. To ensure transparency, fairness, openness, and competitiveness, procurement opportunities continue to be posted on IRENA's website and disseminated to the vendors registered with IRENA. The master procurement plan was updated to reflect the requirements until the end of the year. As of 30 September 2018, 350 procurement contracts for goods and services have taken place totaling USD 5.5 million.

121. General services and travel. Travel support and services were provided to staff, delegates, and participants in conferences and workshops. As of 30 September 2018, the Agency facilitated participation in 42 workshops. The section continues to provide facility management services for IRENA Headquarters and staff. This is an important function which contributes to a healthy and productive work environment while delivering continuous day-to-day services for staff. As part of these ongoing services, General Services has instituted a Health and Safety programme and further enhancement measures are in progress, to be implemented in the future.

Biennial budget overview

2018-2019 Biennium Budget Utilisation by funding source (in USD Thousands)

	2018-2019 Biennium Budget	Utilisation as at 1 December 2018	
		Commitment and Expenses	Proportion of 2018-2019 Biennium Budget
Assessed Contributions (Core Budget)	43,130	21,777	50%
Core Non-Assessed UAE			
UAE Support	5,000	2,101	42%
Governing Body Meetings	3,200	2,473	77%
IT Infrastructure Support	920	491	53%
<i>Subtotal</i>	9,120	5,065	56%
Core Non-Assessed Germany			
Innovation and Technology Centre	10,200	4,969	49%
<i>Subtotal</i>	10,200	4,969	49%
Core Non-Assessed Other Contributions			
Core Non-Assessed Other	1,704	581	34%
<i>Subtotal</i>	1,704	581	34%
Total Core Non-Assessed	21,024	10,615	50%
Grand Total	64,154	32,392	50%

Core Non-Assessed Contributions*as of 1 December 2018, in USD*

	2018	
	Committed	Received
GERMANY		
IRENA Innovation and Technology Centre	5,100,000	5,100,000
United Arab Emirates (UAE)		
UAE Support	2,500,000	2,500,000
Governing Body Meetings	1,600,000	1,600,000
IT Infrastructure Support	460,000	460,000
Subtotal UAE Contributions	4,560,000	4,560,000

Total Budgeted Voluntary Contributions	9,660,000	9,660,000
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Other Voluntary Contributions

Donor/Project	2018	
	Committed	Received
Belgium (Walloon)	1,170,960	1,170,960
Germany	2,264,451	1,923,542
Italy	157,005	157,005
Japan	450,455	450,455
Kingdom of the Netherlands	26,042	26,042
United Arab Emirates (UAE)	1,581,677	1,581,677
UN-ESCWA	32,000	32,000
Subtotal	5,682,590	5,341,681

Fund for Developing Countries Representatives

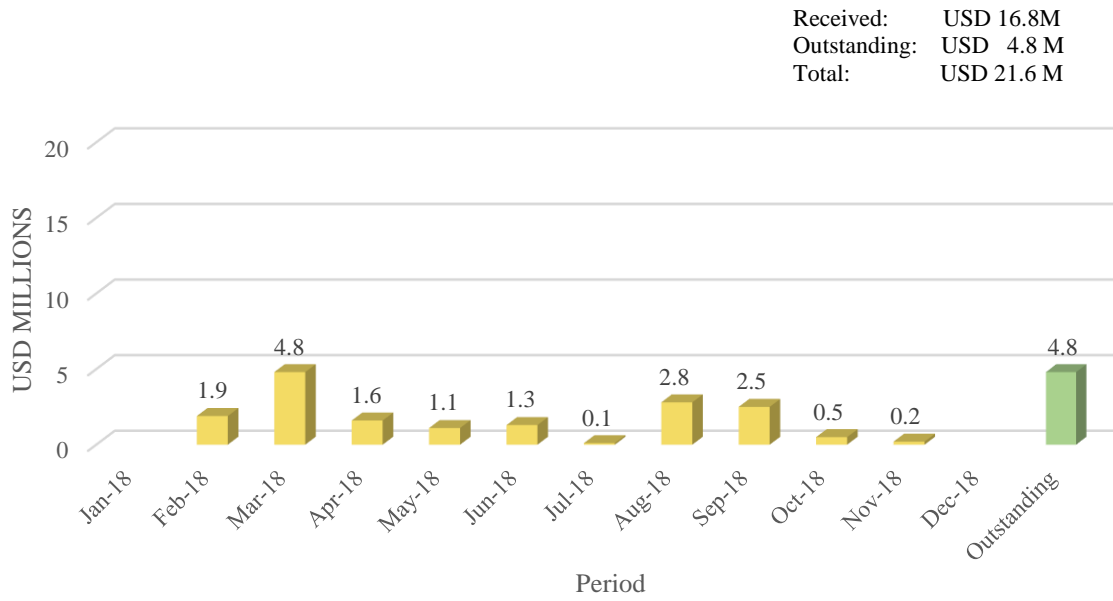
Donor	2018	
	Committed	Received
United Arab Emirates (UAE)	300,000	300,000
Subtotal	300,000	300,000

Total Other Voluntary Contributions	5,982,590	5,641,681
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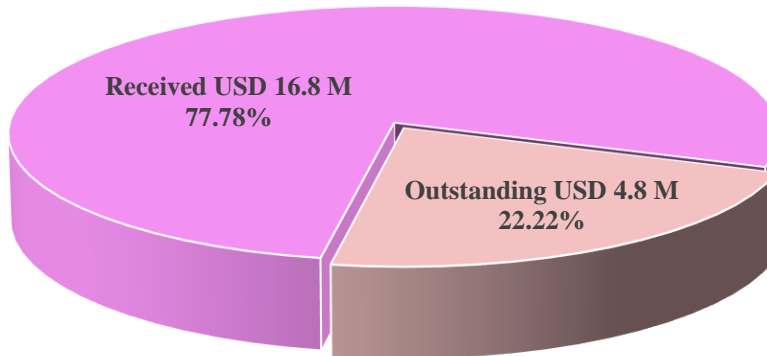
Multi-Year Voluntary Contributions

Donor/Project	Multi-Year Commitments	Received prior to 2018	Received in 2018
European Commission	326,087	97,830	228,257
Germany	6,901,844	2,990,380	3,266,886
Norway	4,732,116	1,816,310	1,416,013
Total	11,960,047	4,904,520	4,911,156

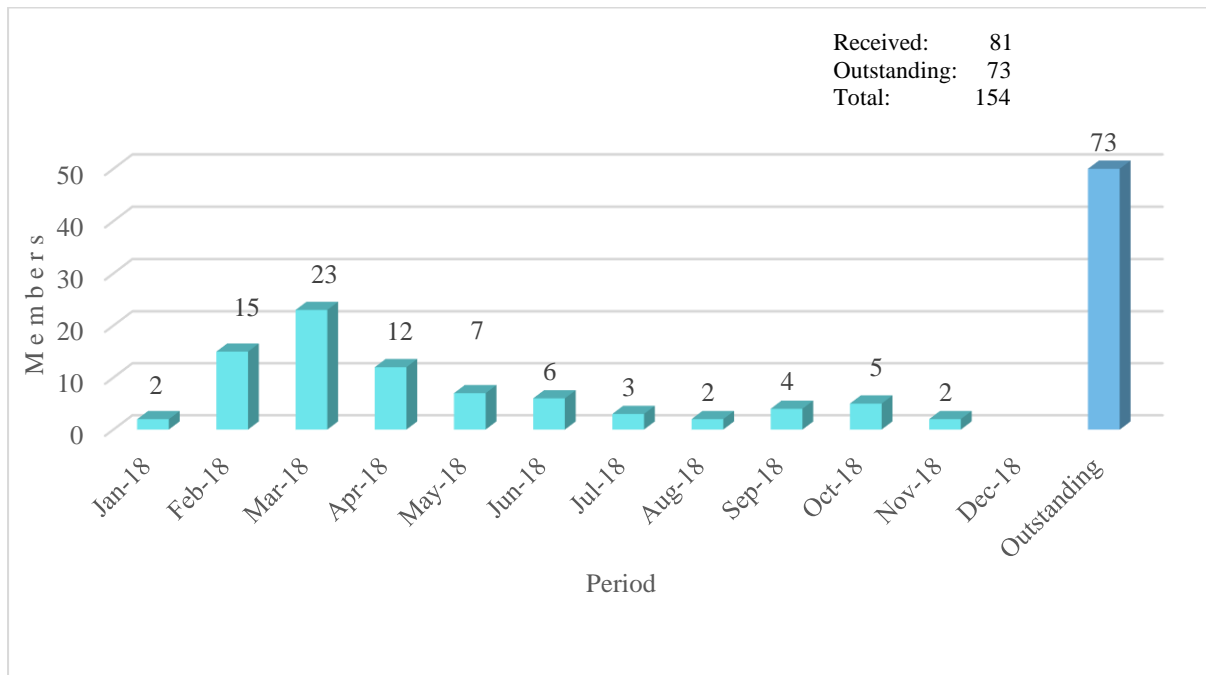
Received and outstanding assessed contributions for 2018 core budget (as of 1 December 2018)



Status of contributions to the 2018 core budget (as of 1 December 2018)



Number of Members with received and outstanding contributions to the 2018 core budget (as of 1 December 2018)



Summary of Progress

Centre of Excellence for Energy Transformation

Objective: Empower effective policy and decision-making by providing authoritative knowledge and analysis on renewables-based energy transformation at global, national and sectoral levels.

Transformation pathways		Core resources: USD 4,020,000
<i>Output: Countries provided with the tools and information necessary to support accelerated deployment of renewable energy.</i>		
Deliverable	Status¹³	Remarks
REmap Global report	In progress	<ul style="list-style-type: none"> - Ongoing collection of country information and data. - REmap wind roadmap (Q1 2019). - Investment and stranded assets analysis (Q2 2019). Ongoing country analyses and updates.
Grid integration planning guide for medium size power systems	Completed	- Technical Planning Studies for the Integration of variable renewables, September 2018.
Global report on policy and market design for integration of VRE	In progress	- In-depth analysis of policies, regulations and market instruments to support flexibility options (Q4 2019).
Report on long-term planning with high share of VRE	In planning	
Analytical briefs (demand-side flexibility; 100% renewable power system operation; system integration costs)	In progress	<ul style="list-style-type: none"> - 100% Renewable operations brief prepared with the University of Michigan. - Grid integration study in preparation with the State Grid Corporation of China (SGCC). - System integration cost draft discussed with experts in September 2018.
Development of Energy Transformation Model (integrating REmap, planning, flexibility and grid assessment models)	In progress	<ul style="list-style-type: none"> - Launch of the report on flexibility for the energy transition at the 16th IRENA Council. - Launch of the IRENA FlexTool at the 16th IRENA Council. - Forthcoming “The Future is RE-Electrification” report in collaboration with SGCC.

¹³ **Definitions:**

In planning: Preliminary discussions about the deliverable have commenced, deliverable concept is available or deliverable is in scoping phase.

In progress: Deliverable scope has been defined, budget and other resources have been identified, implementation has commenced.

Completed: Deliverable has been finalised and/or full completion reached.

Ongoing: Deliverable does not have a finite end, is cyclical or of operational nature (i.e., for governance and management related deliverables).

Technical workshops on best practices for long-term planning and grid assessment	In progress	- Selected events include Energy Modelling Platform for Africa (UNECA) and for Europe (KTH) Addis Ababa, January 2018; Strategic energy planning (UK-DFID), Lisbon, May 2018; Renewable Grid Initiative seminar, Brussels, May 2018; International Energy Workshop in Gothenburg, June 2018; IAEA energy planning seminar, Zagreb, July 2018.
REmap expert network	Ongoing	- REmap focal point meeting, 12 November 2018.
Access solutions		Core resources: USD 1,327,000
<i>Output: Countries informed of technology, policy and finance solutions for improved energy access.</i>		
Deliverable	Status¹	Remarks
Report on renewable energy contribution to access	Completed	- Off-grid statistics, May 2018. - Off-grid Renewable Energy Solutions, Global and Regional Status and Trends, July 2018.
Policy briefs on enabling frameworks for off-grid renewables	Completed	- A report on <i>Policies and regulations for renewable energy mini-grid</i> launched at IOREC 2018.
Convening of stakeholders through IOREC	In progress	- 4 th IOREC, Singapore (31 October–1 November 2018).
Accelerating innovation		Core Resources: USD 3,719,000
<i>Output: Countries are aware of the latest innovations in technology, policies and finance.</i>		
Deliverable	Status¹	Remarks
Innovation Landscape report	In progress	- Innovation Landscape Report for the Power sector under preparation (Q1 2019).
Technology status and outlooks	In progress	- Status report on floating offshore wind, CEM9, May 2018. - Offshore Energy report for G7 countries, Halifax, Canada, September 2018. - Innovation Outlook for Electric Vehicles under preparation (Q4 2018). - Technology brief: Solid biomass for heat and power (Q4 2018).
Global report on innovative policy design and practice	In progress	- Joint IRENA-IEA-REN21 report Renewable Energy Policies in a Time of Transition, April 2018. - Policies for renewables in heating and cooling (Q4 2019).
Analytical briefs on innovative capital market instruments and investment trends	In progress	- Global Landscape of Renewable Energy Finance, January 2018. - <i>Mobilising Institutional Capital for Renewable Energy</i> (Q1 2019).
Design of risk mitigation facilities	In progress	- IRENA expert workshop in Nairobi, Kenya, January 2018. - Concept note developed for the risk mitigation guarantee platform.

Innovation week	Completed	- Bonn, Germany, September 2018.
Engagement with innovation-related fora (CEM, MI)	In progress	- IRENA expert dialogue on innovation for thermal storage technologies, January 2018. - Advice to policy makers on innovation priorities published and presented at the third Mission Innovation Ministerial, Malmo, Sweden, May 2018. - Event on Offshore Wind innovation at CEM9 Denmark/Sweden, May 2018.
Knowledge hub	Core Resources: USD 1,959,000	
<i>Output: Information about renewable energy, including best practice, is presented in a timely and user-friendly way.</i>		
Deliverable	Status¹	Remarks
REthinking energy	In planning	
Report on renewable energy targets and policies	In progress	
IEA/IRENA policy database	Ongoing	- Developing a methodology to gather feedback from Member States on the tool.
REsource search engine maintenance and development	Ongoing	- REsource has been integrated into IRENA's new corporate website, including: statistics on renewable energy auctions, renewables in NDCs, renewable energy balances, REmap options, finance, costing, technology innovation, patents, and socio-economic benefits.

Global Voice of Renewables

Objective: Shape the global discourse on energy transformation by providing relevant timely, high-quality information and access to data on renewable energy.

Realising socio-economic benefits		Core resources: USD 2,552,000
<i>Output: Contribution of renewable energy to socio-economic and climate goals articulated.</i>		
Deliverable	Status¹	Remarks
Quantitative analysis of socio-economic benefits	Completed	- Renewable energy benefits: Measuring the economics V2.0 (launch at the Assmely).
Report on best practice to maximise local benefits from renewable energy projects	In progress	- Maximising community benefits of large-scale renewable energy deployment: Insights from sub-Saharan Africa (Q4 2018). - Analysis of project-level impacts of large-scale wind and solar projects (Q2 2019).
Report on leveraging local capacity (selected technologies)	In progress	- Renewable Energy Benefits: Leveraging Local Capacity for Offshore Wind, May 2018. - Renewable Energy Benefits: Leveraging Local Capacity for Solar Water Heaters (Q4 2018).
Jobs annual review 2018	Completed	- 2018 edition of the <i>Renewable Energy and Jobs - Annual Review</i> , May 2018.
Jobs annual review 2019	In planning	- 2019 edition of the <i>Renewable Energy and Jobs - Annual Review</i> (Q2 2019).
Analytical framework for the renewable energy components in NDCs	In progress	- Design and preparatory work for the implementation of the NDC facility. - Member of the NDC Partnership (as of August 2018). - Input to UNFCCC in support of the Talanoa Dialogue, December 2018.
Informing markets		Core resources: USD 4,161,000
<i>Output: Unbiased, timely and accurate information about renewable energy trends and developments.</i>		
Deliverable	Status¹	Remarks
Renewable energy statistics 2018	Completed	- <i>Renewable Capacity Statistics</i> , March 2018. - <i>Renewable Energy Statistics</i> , June 2018.
Renewable energy statistics 2019	In planning	
Four cost-related reports, including annual updates on power generation	In progress	- <i>Renewable Power Generation Costs in 2017</i> , January 2018. - <i>Assessment of future energy subsidy needs</i> (Q2 2019). - <i>Solar and Wind Cost Reduction Potential in G20 Countries to 2030</i> (Q2 2019).
Two topical cost briefs	In progress	- <i>Energy Technology Learning Curves for Policy Making</i> (Q1 2019).
Two reports on quality assurance (offshore wind and smart grids)	In planning	

Technical guides on data collection	In planning	
Technical guides on quality infrastructure for emerging renewable energy technologies	In planning	- <i>Nurturing Offshore Wind Markets: Good practices for international standardization</i> , May 2018. - Implementing quality infrastructure for mini-grids (Q1 2019).
Expanded Renewable Cost Database	In progress	- IRENA Renewable Cost Database expanded to 17,000 projects and the PPA/Auction database to 8,000 projects.
INSPIRE platform enhancement	Completed	- New data dashboards, May 2018.
INSPIRE new module on quality assurance systems for renewables	Completed	- New module available at: http://inspire.irena.org/Pages/qualityassurance/start.aspx .
Training on data collection	In progress	- West Africa Renewable Energy Statistics Training Workshop, Abuja, Nigeria (Q1 2019).
Training on the implementation of quality infrastructure	Ongoing	- Training for Asia on developing quality infrastructure for PV, June 2018.
Amplifying impact		Core resources: USD 5,566,000
<i>Output: Knowledge generated by IRENA is disseminated widely and accessible to target audiences.</i>		
Deliverable	Status¹	Remarks
Communication content for broad consumption	In progress	
Communication content for target audiences	In progress	- Periodic e-bulletin and publication briefs issued. - Selective, targeted translation of press releases, promotional materials (e.g. IRENA/ADFD 7 th cycle flyers and publications).
IRENA website maintenance	Ongoing	- “Our Collections” range on publications page expanded.
Publication development planning and management	In progress	- New email format for sharing targeted IRENA publications piloted with the launch of <i>Renewable Energy Prospects for the European Union</i> report.
Collaboration with media	Ongoing	- The Assembly-hosted media programme has cultivated key relationships with reporters from global news outlets.
Member Communicators network	In progress	- Communications survey conducted to refine support to Members in assessing the critical facets of the global energy transformation.
Dissemination of IRENA knowledge products (traditional and digital)	In progress	- ISBN registration expanded, capturing key releases since 2012 and improving visibility and accessibility for all IRENA output. - “Renewables and Climate” briefs and web content for UNFCCC COP 24.

Network Hub

Objective: Provide an inclusive platform for all stakeholders, to foster action, convergence of efforts and knowledge sharing for impact on the ground.

Regional action agenda		Core resources: USD 7,025,000
<i>Output: Regional action plans and initiatives supported by IRENA.</i>		
Deliverable	Status¹	Remarks
SEE regional market analysis	In progress	<ul style="list-style-type: none"> - Policy Guidelines on Competitive Selection and Support for Renewable Energy, IRENA, European Bank for Reconstruction and Development, and the Energy Community Secretariat, March 2018. - Renewable Energy Regional Market Analysis: South East Europe (Q2 2019).
GCC regional market analysis	Completed	<ul style="list-style-type: none"> - Renewable Energy Regional Market Analysis: the GCC (Q1 2019).
Solar and wind site assessment/mapping (Africa, Central Asia, MENA)	In progress	<ul style="list-style-type: none"> - Suitability analysis of solar and wind development areas completed for the GCC and in progress for Central Asia. Site assessment support provided to 5 countries in Africa.
Financial assessment tool for renewable energy PPAs (Latin America)	In progress	<ul style="list-style-type: none"> - Tool developed for Panama. Report under finalisation (Q4 2018).
Planning workshops (Africa, MENA, SEE, South East Asia)	In progress	<ul style="list-style-type: none"> - Assessment of non-hydro renewable energy prospects in the ACEC in progress and preliminary insights presented to PIDA Steering Committee, March 2018. - South East Europe workshop on planning and operating systems with higher shares of variable renewable energy, Austria, November 2018. - Analysis of planning and prospects for renewable energy in Central Africa (date TBD). - MENA long term energy planning workshop (date TBD).
Regulations and policy workshops (Africa, Latin America, Central Asia, MENA, SEE, South East Asia)	In progress	<ul style="list-style-type: none"> - CECCA regional meeting in Panama, May 2018. - Regional trainings on the development on renewable energy PPAs in West Africa, Cote D'Ivoire and Ghana, June and July 2018. - Regional workshop on accelerating energy transformation in Latin America, Ecuador, August 2018. - Regional Workshop on Policy Support Mechanisms in Central Asia, Azerbaijan, October 2018. - RE Policy Workshop for South East Asia, Malaysia, November 2018.
Renewable energy statistics workshop (Central Asia)	Completed	<ul style="list-style-type: none"> - Central Asia Renewable Energy Statistics Training Workshop, UAE, September 2018.

Project development workshop (SEE)	Completed	- South East Europe Regional Workshop on RE project development and financing, Serbia, June 2018.
Grid integration workshops (Africa, Central Asia, Latin America, South East Asia)	In progress	- Regional training on the planning and operation of grids with higher shares of variable renewable energy in West Africa, Cote D'Ivoire and Ghana, May 2018. - Grid integration and planning technical workshop for the Clean Energy Corridor of Central America, El Salvador, December 2018.
Regional collaboration platforms and partnerships	In progress	- Joint Declaration by IRENA and International Solar Alliance (ISA) for the promotion of solar energy, India, March 2018. - Consultative meeting on the next phase of implementation of the Africa Clean Energy Corridor, Namibia, October 2018. - MoU between ASEAN and IRENA (signed in Singapore on 30 October 2018). - ECCAS Renewable Energy Validated in November 2018 in Kigali, Rwanda.
Collaborative platforms		Core resources: USD 1,299,000
<i>Output: Multi-stakeholder approaches to renewable energy deployment are supported by IRENA.</i>		
Deliverable	Status¹	Remarks
Annual progress report on SIDS Lighthouses initiative	In progress	- SIDS Lighthouses Quickscan: Interim report, January 2018. - Updated Quickscan methodology (Q2 2019). - Ongoing tracking of renewable energy capacity installed and key initiatives in SIDS.
SIDS knowledge sharing platform	In progress	- Webinars on renewable energy in SIDS (Q1 and Q2 2019). - SIDS Lighthouses website revamped and updated. - Compilation of country profiles for SIDS under preparation.
GGA knowledge sharing platform	In progress	- Renewable Energy Day with focus on geothermal energy in the framework of the Energy Congress of Central America, El Salvador, August 2018. - GGA website update under preparation.
SIDS Lighthouses Facilitation	Ongoing	- SIDS Lighthouses 2.0 launched during UNGA, September 2018. - Ministerial Meeting on SIDS Lighthouses, January 2019. - Consultation with LHI partners on the next phase of the Initiative.
GGA co-ordination	Ongoing	- New members/partners: Japan, Ethiopia, Geothermal Cluster of Mexico (CeMIEGeo), Organisation of Eastern Caribbean States.
Creation of GGA Practitioner Group	In progress	- GGA Geothermal Clusters workshop: <i>Strategies for future collaboration</i> , Iceland, April 2018.

Multi-stakeholder engagement		Core resources: USD 1,695,000
<i>Output: Engagement of a broad range of stakeholders is supported through IRENA communications and events.</i>		
Deliverable	Status¹	Remarks
Coalition of Action web platform	Completed	- New Coalition for Action website, April 2018.
Coalition for Action co-ordination	Ongoing	- renewables4development, May 2018, and renewables4climate (November 2018) communication campaigns. - <i>Scaling Up of Renewable Energy Investment in Algeria, Ghana and Vietnam</i> , January 2019. - <i>Community Energy Finance</i> , (white paper), January 2019. (white paper). - <i>Towards 100% Renewable Energy</i> , (white paper), January 2019.
Communication and outreach to parliamentarians	Ongoing	- Co-operation with the Inter-Parliamentary Union (IPU) and parliamentary stakeholders on the implementation of the SDG7. - Public-private dialogue between legislators, members of the Coalition for Action and government representatives initiated.
Tailored information for parliamentarians	Ongoing	- The Review for Parliamentarians (quarterly).

Source of Advice and Support

Objective: Support country level decision-making to accelerate the renewables-based transformation of national energy systems, advance strategies to diversify energy sources, reduce global emissions and achieve sustainable development.

Project support and facilitation		Core resources: USD 2,460,000
<i>Output: Tools, platforms and partnerships are provided to support renewable energy deployment.</i>		
Deliverable	Status¹	Remarks
Design and development of standardised contract templates	In progress	- The standardised contract templates currently undergoing peer review.
Functional Global Atlas Applications	In progress	- Suitability analysis and site appraisal methodologies operational and in use. - A new and simplified user interface is being designed with the release of a new platform (Global Atlas 4.0, Q3 2019).
IRENA Project tracker dashboard	In progress	- The project tracker testing in progress.
Project Navigator module on competitive technical requirements for EPC tender	In progress	- Expected in Q2 2019.
Sustainable energy Marketplace global coverage	Completed	- The Sustainable Energy Marketplace covers all countries in Sub-Saharan Africa, Latin America, Asia, South-East Europe and Small Island Developing States.
Project collection and screening	Ongoing	- A platform-wide review to enhance project quality (completed). - 26 new projects registered (Afghanistan, Argentina, Bahamas, Bangladesh, Barbados, Cambodia, Chile, El Salvador, Eswatini, India, Indonesia, Nigeria, Papua New Guinea, Philippines, Sierra Leone, Sri Lanka, Thailand, Togo, United Republic of Tanzania) increasing the total to 198 projects. - 15 new financial instruments registered; increasing the total to 158 (offered by 64 financial institutions).

Project Navigator modules in French	In progress	<ul style="list-style-type: none"> - Technical Guidelines for Mini-grid Applications, Residential PV Projects, and Woody Biomass Projects (French). - Technical Guidelines for Geothermal Power Projects, Utility Scale PV Projects, and Mini-grid Applications (Spanish).
Dissemination of standardised contract templates	In planning	
Marketplace regional platforms	In progress	<ul style="list-style-type: none"> - Asia regional platform launched at the Asia Clean Energy Forum, Manila, Philippines, June 2018. - South East Europe regional platform launched at the International Forum on Energy for Sustainable Development in Kiev, Ukraine, November 2018. - SIDS platform for the Pacific region launched at the ADFIP Annual Meeting in Fiji, November 2018.
Capacity building workshops on project development	Ongoing	<ul style="list-style-type: none"> - Workshop on the development of bankable solar PV projects, Singapore, March 2018. - Contribution to the webinar series with the USAID-led network <i>Women in African Power</i>, March 2018. - Workshop on the development of bankable solar PV projects, Singapore, March 2018. - Navigator Workshop for SEE project stakeholders, Q2 2018. - Navigator Workshop for Egyptian project stakeholders (Q4 2018).
Renewable energy solutions lab		Core resources: USD 775,000
<i>Output: Information and capacity building provided on renewable energy solutions for sustainable livelihoods.</i>		
Deliverable	Status¹	Remarks
Three policy briefs on nexus-related topics	Completed	<ul style="list-style-type: none"> - <i>Water Use in India's Power Sector - Impact of renewables and cooling technologies to 2030</i>, January 2018. - SEA case studies on <i>Off-grid Renewable Energy Solutions to Improve Livelihoods</i>, June 2018. - Renewable Energy and Gender report (January 2019).
Southern African Development Community (SADC) Renewable Energy Entrepreneurship Support Facility	In progress	<ul style="list-style-type: none"> - First call for applications, May 2018.

Two workshops for entrepreneurs, financing institutions and incubation centres	In planning	
Direct mentoring	In progress	<ul style="list-style-type: none"> - Contribution to a regional certification scheme for the improvement of sustainable energy skills in the 15-member states of ECOWAS. - Pilot certification examination for off-grid solar PV technicians in Ghana and Senegal.
Local solutions and tailored advice		Core resources: USD 2,757,000
<i>Output: Advice and capacity building provided to countries about the options for accelerated deployment of renewable energy.</i>		
Deliverable	Status¹	Remarks
Five country processes for renewables-based transition	In progress	<ul style="list-style-type: none"> - RRA Pakistan and RRA Panama launched in April and May 2018, respectively. - Renewable Energy Outlook: Egypt, Cairo, October 2018. - REmap South Africa (Q1 2019). - RRA in Azerbaijan, Bhutan, Botswana, Mali, Republic of Moldova and Tunisia (ongoing). - RRA-REmap for Lebanon (forthcoming). - RRA-REmap for South Korea (forthcoming).
Power system flexibility assessment for countries upon request	Completed	- FlexTool case study applications in Columbia, Panama, Thailand and Uruguay.
National master plans supported in Africa	In progress	- Support to Eswatini for the preparation of a national Energy Masterplan, October 2018.
Grid integration and power system operation support upon request	In progress	

International Co-operation and Strategic Engagement

Objective: Provide leadership in global agenda-setting on energy transformation and ensure active Member participation in the delivery of the programme of work.

International co-operation and strategic management		Core resources: USD 5,018,000
Outputs	Status¹	Remarks
Strategic management of the Agency and thought leadership and coherence of the message on renewables in the global discourse on energy.	Ongoing	<ul style="list-style-type: none"> - Global Commission on the Geopolitics of Energy Transformation launched, January 2018, four meetings of the Commission completed. - Selected high-level participation of the Director-General: <ul style="list-style-type: none"> • Global Conference on SDG7, February 2018; • SDG's Global Councils, World Government Summit, February 2018; • The founding conference of the International Solar Alliance (ISA), March 2018; • Berlin Energy Transition Dialogue, April 2018; • 4th Iceland Geothermal Conference, April 2018; • 9th Clean Energy Ministerial (CEM9) and the 3rd Mission Innovation Ministerial (MI3), May 2018; • 3rd High-Level Political Forum on Sustainable Development, July 2018; • The G7 Energy Ministers Meeting, September 2018; • United Nations General Assembly (UNGA), September 2018; • Belt and Road Energy Ministerial and Third International Forum on Energy Transitions, October 2018; • ASEAN Ministers on Energy Meeting and Singapore International Energy Week, October 2018.
Regular Member interaction and co-operation on programmatic and governance issues.	Ongoing	<ul style="list-style-type: none"> - Programme and Strategy Committee, Administrative and Finance Committee, and 15th and 16th Council meetings. - Side events on the margins of the 15th and 16th Council meetings. - Ongoing interaction on programmatic and governance issues with the Permanent Representatives and Headquarters-based representatives of the Membership.
Effective communication and outreach to Members to ensure the flow of information and active engagement.	Ongoing	<ul style="list-style-type: none"> - Member communication survey undertaken. - New Member Bulletin format to showcase RE developments in Member countries. - New publication emails for Members. - Communication initiatives implemented, including a quarterly. - Updates to the IRENA Member Portal to make it more user-friendly.

Governing body meetings		Core resources: USD 3,200,000
Outputs	Status¹	Remarks
Substantive support and efficient servicing of meetings of the governing bodies is ensured.	Ongoing	<ul style="list-style-type: none"> - Eighth session of the Assembly and related meetings, January 2018. - Fifteenth meeting of the Council and related meetings, May 2018. - Sixteenth meeting of the Council and related meetings, November 2018. - Preparations for the ninth session of the Assembly. - Planning and organisation of governing body meetings consolidated and streamlined. - Documents available electronically on the IRENA Meeting Mobile Application. Reduced printing by 55% compared to the previous year.

Efficient, Transparent and Innovative Management

Objective: Ensure quality and accountability in programme planning and implementation and the associated management of financial, human and information technology resources to achieve impact in the programme of work and medium-term strategy.

Strategic Management		Core resources: USD 4,448,000
Outputs	Status¹	Remarks
Accountability and transparency in the management of the Agency and its resources.	Ongoing	- Ongoing review of business processes and improvements in reporting to Members.
Resource diversification strategies and plans developed and operationalised.	Ongoing	- Engagement with potential partners. - Secured additional contributions. - Development of communication materials based on the WP and MTS. - Co-ordination and development of substantive and contractual arrangements for VCs. - Reporting to contributors.
Evaluation system to monitor progress and improve performance over successive programmatic cycles introduced.	In progress	- Monitoring and evaluation mechanisms, including qualitative and quantitative data collection system, under implementation.
Effective review, oversight and legal support with timely implementation of related recommendations.	Ongoing	- Continuous legal support and advice on the application of IRENA regulations, rules and procedures. - Review of contracts for the procurement of goods and services, memoranda of understanding and voluntary contribution agreements. - Ongoing discussion on a supplementary agreement with the Government of the United Arab Emirates concerning IRENA's occupancy of its headquarters in Abu Dhabi.
Administration and Management Support		Core resources: USD 12,172,000
Outputs	Status¹	Remarks
Effective workforce planning and efficient staff recruitment maintained, with due regard for geographical representation and gender balance.	Ongoing	- 24 vacancies (core and non-core) announced and over 2200 applications received. - Out of 90 core posts, 78 are filled or under recruitment (70 filled and 8 under active recruitment). - The 70 staff are from 40 nationalities out of which 46% are women and 54% are men.
Effective utilisation of resources through finance and budgetary management, in line with IRENA regulations and procedures.	Ongoing	- Financial Statements for 2017. - Unqualified external audit.

Efficient support to programme implementation, including procurement, travel and general services, compliant with IRENA rules, regulations and procedures.	Ongoing	- Annual Agency-wide procurement plan.
The use of ICT tools and services to improve organisational effectiveness and staff productivity.	Ongoing	- Implementation of the Oracle ERP system.

Overview of Programmatic Activities Funded by Voluntary Contributions

Centre of Excellence for Energy Transformation		
Contribution	Project	Selected Outputs
European Commission	REmap European Union Study	- Renewable Energy Prospects for the European Union, Brussels, February 2018.
European Commission (forthcoming)	REmap for Central and South East Europe (CESEC)	- REmap CESEC (Q4 2019).
Germany	Role of investments and innovation in the global energy transition	- Global Energy Transition: a roadmap to 2050, Berlin, April 2018.
Germany ¹⁴	Energy Solutions for Cities of the Future	- Urban best practices, technology solutions, and economic aspects in selected cities in China, Costa Rica, and Uganda.
Germany	Energy Transition	- Framework for storage valuation (Q2 2019). - Global Energy Transition report (Q2 2019)
Japan	Roadmaps on RE grid and electricity storage and research work focusing on quality of renewable technologies	- Framework for storage valuation (Q2 2019). - Renewable energy auctions - update (Q2 2019).
Japan	Research activities on RE and hydrogen	- Hydrogen from renewable power: Technology outlook for the energy transition, released in September 2018.
Norway	Voluntary core contributions in support of WPB and MTS	- 4th IOREC Conference, Singapore, (31 October – 1 November 2018).
Denmark, Germany	Long-term energy planning	- Wider adoption of long-term model-based energy scenarios promoted by CEM Campaign.

¹⁴ International Climate Initiative (IKI) of the German Government.

Global Voice of Renewables		
Contribution	Project	Selected Outputs
Germany	Solar PV and onshore wind cost and outlook for competitiveness to 2025 for G20 countries	<ul style="list-style-type: none"> - Solar & Wind Cost Reduction Potential in G20 Countries to 2030 in G20 (Q2 2019). - Database of fossil fuel-fired power plant investment costs, efficiency and fuel costs. - Second edition of the report <i>Renewable energy benefits: Measuring the Economics</i> (January 2019).
Germany	Renewables in buildings and industry: Heat Pump costs and performance, and flexibility potential to 2030	<ul style="list-style-type: none"> - Renewables in the Building Sector: Heat Pump Costs and Performance (Q3 2019). - Flexibility potential from power-to-heat and strategies to enable further VRE deployment in the power sector (Q3 2019).
Italy, UAE	Primal Sonic Visions	<ul style="list-style-type: none"> - Visions of Sustainability at the Venice Biennale.
Japan	Quality of renewable technologies; Cost and reliability of renewable energy in harsh operating conditions	<ul style="list-style-type: none"> - Solar PV costs in Japan: Opportunities for Cost Reduction (Q1 2019). - Guidelines to mitigate technical risks for wind and PV systems in locations with extreme weather conditions (Q2 2019).
Japan	NDC/climate related work, especially for market mechanisms	<ul style="list-style-type: none"> - Study regarding possible role of market instruments, including carbon markets (forthcoming Q2 2019).
Denmark	Long-term energy planning	<ul style="list-style-type: none"> - Socio-economic benefits of RE deployment. - The Clean Energy Investment Coalition.

Network Hub		
Contribution	Project	Selected Outputs
France, Iceland, Japan, Switzerland	The Global Geothermal Alliance	<ul style="list-style-type: none"> - GGA Workshop on Geothermal Direct Utilisation and Food Security, Iceland, April 2018. - GGA Regional workshop on Geothermal Financing and Risk Mitigation in Kenya, February 2018. - Geothermal Assessment in East Africa (Q2 2019). - Pilot project to inventory and classify geothermal fields in the Caribbean Islands, El Salvador, Ethiopia, Indonesia (in progress, jointly with World Bank and IGA). - Technical data gathering and classification sessions completed in Indonesia (March 2018) and in the Caribbean Islands (December, 2018). Ethiopia and El Salvador scheduled for March and April 2019. - Resource estimate reports for 14 geothermal fields under final review.
Germany	Corporate Sourcing of Renewable Energy	<ul style="list-style-type: none"> - REMade Index on corporate sourcing of renewable energy, CEM9, May 2018.
France, Germany ¹⁵ , Japan, Netherlands, Norway, UAE	Support for IRENA's SIDS Lighthouses Initiative	<ul style="list-style-type: none"> - High-Level Roundtable on SIDS Lighthouses Initiative 2.0, USA, September 2018. - Webinars on renewable energy systems for SIDS (Q1 2019). - Project Navigator Workshops for Pacific and Caribbean SIDS, 15-19 October 2018. - Caribbean region project finance matchmaking forum, Miami, 7 November 2018. - Regional workshop, Aruba (26-28 November 2018). - Pacific regional workshop for the capacity building of national banks and financial institutions, Suva, Fiji, 22-23 November 2018.

¹⁵ As part of the International Climate Initiative (IKI) of the German Government.

		- Caribbean regional workshop for the capacity building of national banks and financial institutions for bankers (Q1 2019).
Japan	Biomass related analysis	- Workshop on Sustainable Rural Bioenergy Solutions in Sub-Saharan Africa, January 2018. - Food and Fuel: Bioenergy Potential from Agroforestry and Nitrogen-Fixing Wood Crops in Africa (Q4 2018). - Scaling up Bioenergy from Sugarcane in Africa (in progress).
Denmark	Long-term energy planning	- Regional analysis and energy transition system dynamics (ASEAN region). - Enhanced South-South co-operation on long-term energy planning.

Source of Advice and Support		
Contribution	Project	Selected Outputs
Belgium (Walloon Government)	Nationally determined contributions: NDC Facility and NDC Partnership	- Renewable Energy Target Setting update (Q4 2019). - Country-level review of RE in NDCs and support within the NDC Partnership. - RE and adaptation study. - Talanoa dialogue.
Belgium (Walloon Government)	Off-grid application solutions and decentralised solutions in remote setting	- SADC RE Entrepreneurship Support Facility regional meeting, Namibia, October 2018. - Assessment of energy usage patterns in refugee settlements. - IRENA/UNHCR collaboration for camps in Ethiopia and Iraq. - International Conference on Renewable Energy Solutions for Healthcare Facilities, Singapore, 2 November 2018.
Germany ¹⁶	Support for IRENA's SIDS Lighthouses Initiative	- Grid integration and power system operation support for Vanuatu (Q4 2018), Fiji (Q1 2019) and Dominican Republic (Q1 2019). - Enhanced project facilitation services for RE projects in SIDS.

¹⁶ As part of the International Climate Initiative (IKI) of the German Government.

Japan, Norway	Project facilitation/Voluntary core contribution in support of WPB and MTS	<ul style="list-style-type: none"> - In 2018, the Agency supported in Comoros, Eswatini, Nauru, Nigeria, and Sudan in screening 25 prospective sites (13 solar and 12 wind) for solar and wind development. - Prospective combined capacity of the sites identified reaches 71.5 MW and 521.2 MW for solar and wind respectively. - Site screening and assessments currently conducted in Morocco, Nigeria, Sudan, and Zambia.
Germany ¹⁷	Energy Solutions for Cities of the Future	<ul style="list-style-type: none"> - Study on renewable energy applications for district heating and cooling in the urban setting (Q4 2019). - A methodology report to support the demonstration of Solar City Rooftop Simulators in two cities from developing countries (Q1, 2019). - The simulator, a 3-Dimensional rooftop footprint for the city of Kasese in Uganda is being developed.
Japan	Collaboration activity for REmap and RRA, especially for South and South East Asian countries	<ul style="list-style-type: none"> - RRA Bhutan (in progress).
Norway	Voluntary core contributions in support of WPB and MTS	<ul style="list-style-type: none"> - Energy planning training courses in Sierra Leone, Aug-Sep 2018.
Norway	Voluntary core contributions in support of WPB and MTS	<ul style="list-style-type: none"> - RRA Republic of Moldova, El Salvador and Jordan (in progress).
UAE	IRENA/ADFD Project Facility	<ul style="list-style-type: none"> - Sixth project cycle (in progress).

¹⁷ As part of the International Climate Initiative (IKI) of the German Government.

International Co-operation and Strategic Engagement		
Contribution	Project	Remarks
Germany, Netherlands, Norway, UAE	Global Commission on the Geopolitics of Global Energy Transformation	- Meetings in Berlin in April, Oslo in June, Reykjavik in October, and in Abu Dhabi in November 2018; preparation of outcome report (in progress).
Germany, UAE	Fund for Developing Country Representatives	
Denmark	Long-term energy planning	- Support for the UNSG Climate Summit.